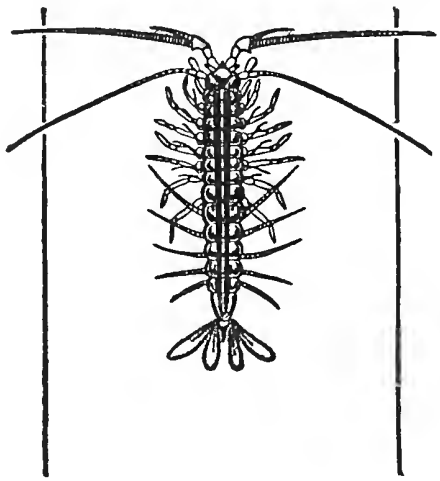
No. 84

RECORDS OF THE QUEEN VICTORIA MUSEUM LAUNCESTON



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THE VEGETATION, FAUNA AND ARCHAEOLOGY OF ORDNANCE POINT, NORTH-WESTERN TASMANIA

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Manuscript received 27/9/82 *Published 31/1/84*

Little has been recorded on the natural history of the west coast of Tasmania. In recent years, improved vehicular access to areas south of the Arthur River has resulted in ever-increasing pressures on the environment from cattle grazing and from human recreational activities.

In March and April 1981 an expedition staffed and financed by "Earthwatch", under the direction of the Queen Victoria Museum, spent 39 days on a biological survey in the vicinity of Ordnance Point, observing and collecting botanical and zoological material for lodgement in the Queen Victoria Museum. These resulted in the collection and curation of 602 specimens comprising 71 species of terrestrial vertebrates as well as fish, much invertebrate material and a considerable extension to the previously known range of numerous species.

Two plants *Beyeria leschenaultii* (Family Euphorbiaceae) and *Leucopogon lanceolatus* (Family Epacridaceae), the Tasmanian distribution of which was thought to be now restricted to the Bass Strait islands, were found to exist at least as far south as Ordnance Point.

The White-footed Dunnart *Sminthopsis leucopus* and Broad-toothed Rat *Mastacomys fuscus* were collected, their nearest previously known location being near Waratah and in the Cradle Mountain — Lake St. Clair reserve about 70km east.

The Swamp Antechinus *Antechinus minimus,* Eastern Swamp-rat *Rattus lutreolus* and Long-tailed rat *Pseudomys higginsi* were found to be common, their nearest previous recording being near the Arthur River about 30km to the north-east.

Orange-bellied Parrots *Neophema chrysogaster* were seen on the coast on five days between 8 March and 14 April. White-throated Needletails *Hirundapus caudacutus* were in great numbers in the last week of March. Southern Emu-wren *Stipiturus malachurus,* Calamanthus *Sericornis fuliginosus* and Tawny-crowned Honeyeater *Phylidonyris*

melanops were all common. The Tasmanian Thornbill *Acanthiza ewingii* and Brown Thornbill *Acanthiza pusilla* were common and found living together in the teatree scrub and stunted eucalypts. Observations on the seasonal movements of several bird species were recorded.

A Tussock Skink *Leiolopisma entrecasteauxii* of a form inconsistant with that commonly thought Tasmanian was collected. The Brown-striped Frog *Limnodynastes peroni* was collected, the record representing the most southerly known point of its distribution.

A Butterfly Mackerel *Gasterochisma melampus*, the third record from Tasmania, was found beachwashed alive at Ordnance Point.

An archaeological survey revealed 33 midden sites and one rock engraving site, and comments are given on midden types, location, antiquity and content.

INTRODUCTION

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Much of the Crown land on the west coast of Tasmania has, until recent years, been relatively inaccessible, there being very few settlements, access roads or satisfactory all-weather anchorages for small ships. In the north-west, the Arthur River was a barrier which impeded the spread of pastoral and grazing activities from the agriculturally rich settlements to its north. Bridging of this river at its estuary in February 1971, so replacing the old barge crossing, provided improved access, opened the coastal strip to the south and fostered the spread of cattle grazing, sea fisheries, camping and tourism. Roads and tracks have been progressively upgraded and extended and four-wheel drive vehicles can now penetrate as far south as Sandy Cape Beach, and even to Sandy Cape and beyond when beaches are sufficiently firm to support vehicles.

Many areas along the coast are suitable for open-range grazing of cattle and in autumn 5 000 to 8 000 are driven over the Arthur River bridge to spend the winter months foraging from there to Sandy Cape.

The recent increasing price for Rock Lobster *Jasus lalandii* has prompted an increase in land-based fishing interests and promoted a network of access tracks to natural boat launching sites. Many of these tracks were subsequently utilised by holiday-makers and tourists who now invade the area in thousands every summer to camp, explore, fish, shoot, drive trail bikes and dune buggies, and enjoy general holiday recreation as far south as Sandy Cape and beyond.

The area, being mostly Crown land, is under the control of the State Department of Lands which regulates and supervises the agistment of cattle south of the Arthur River and the access of vehicles south of Greenes Creek.

Little attention has been given to investigating the fauna of Tasmania's north-west and much of the area between the Arthur River and the Pieman River had, until about the middle of the present century, remained almost as it was in Aboriginal times. Kitchen middens (Plates 1 and 2) and rock carvings, formed by the Aborigines, still remain today in evidence of a lost

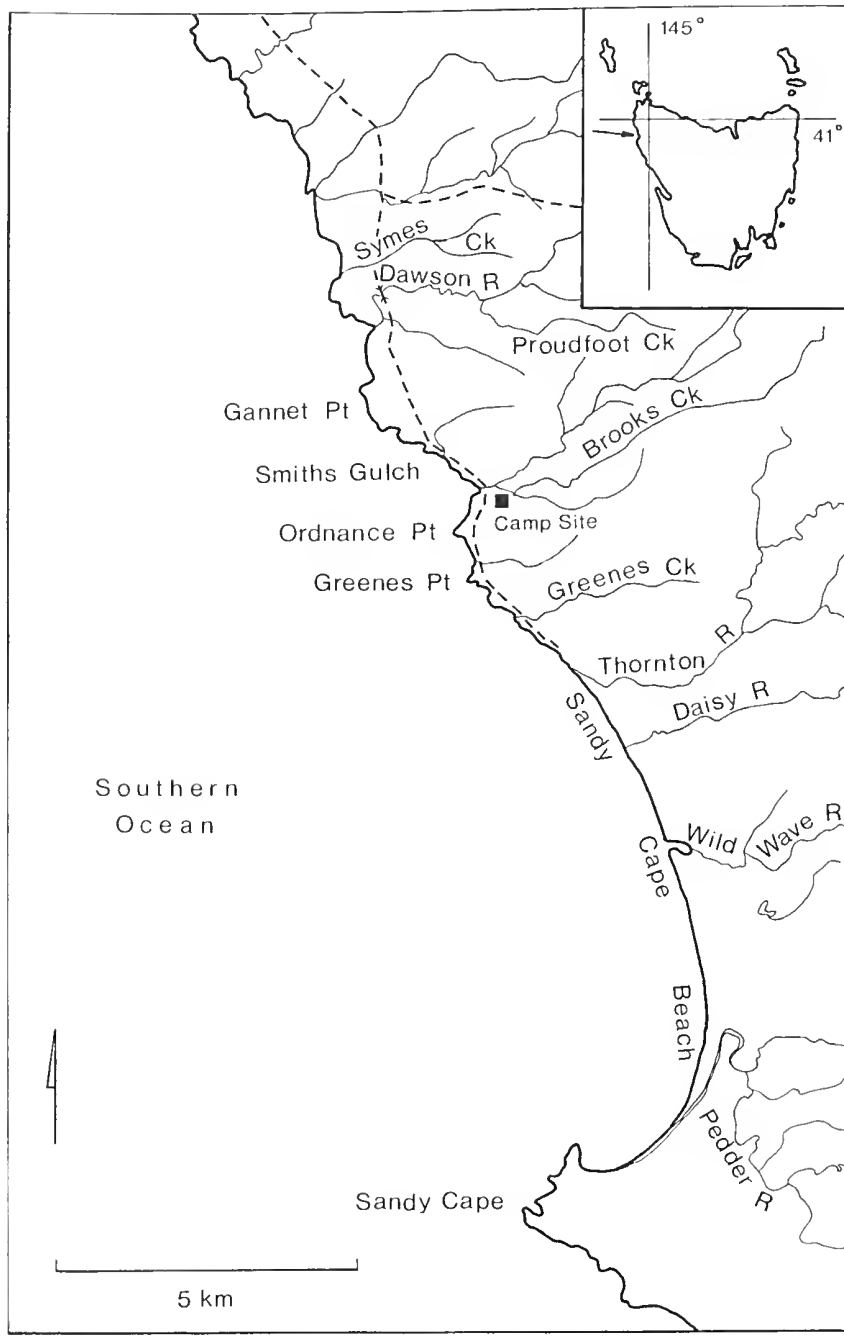

Fig. 1
The study area around Ordnance Point.

Plate 1
Looking north-east from Ordnance Point along the northern side of the peninsula where numerous species of sea-birds and waders were regularly found. The foreground is an Aboriginal midden. Smiths Gulch and Brooks Creek estuary are in the middle distance.

Plate 2
Looking inland along Ordnance Point peninsula across which the sea breaks at times of high seas. Sea birds and waders are always present. The edge of an Aboriginal midden is shown on the right.

culture which appears to have thrived on this exposed, windswept coast where the influence of north-westerly winds and periodic firing of the vegetation is starkly evident in the stunted, twisted vegetation.

As the environment appears fragile and subject to every-increasing pressure from the invasion of man and cattle, it seemed highly desirable to attempt to learn something about the fauna and flora as soon as possible. In 1980 Dr. James D. Lazell Jnr. of The Conservation Agency, Jamestown, U.S.A. offered to search for funds and personnel to mount an expedition to investigate the fauna and flora of a small area on the north-west coast during the autumn of 1981. The "Earthwatch" organisation of Massachusetts U.S.A. was approached and agreed to support such a venture under Dr. Lazell's leadership, the Queen Victoria Museum providing scientific personnel and equipment and the subsequent collating and curating of the data and collections. Mr. James Malley of Smithton, who has an extensive knowledge of the geography of the north-west, agreed to join the expedition as guide and location organiser.

Ordnance Point (see Fig. 1, Plates 1 and 2) was agreed upon for the study area, being little known zoologically and about as far south of Arthur River as was conveniently accessible. A site for the base camp (Plate 3) was selected about half a kilometre inland, near the estuary of Brooks Creek. The expedition comprised three visits as follows: 28 February to 13 March, 16 persons; 21 March to 3 April, 19 persons; 11 to 24 April, 16 persons. All accommodation was under canvas and consisted of small personal tents, a larger mess tent and a small, open specimen preparation tent. Personnel and gear were transported between Launceston and Smithton by charter bus, and between Smithton and Ordnance Point by several four-wheel drive vehicles. Camp was established by the first party on arrival and dismantled by the last party upon departure. The "Earthwatch" personnel included a wide spectrum of talents and interests and were engaged in general collecting, observing, data recording and assisting with specimen preparation as best suited their various interests and qualities.

Plate 3
Looking east over the base camp site (centre) amid coastal scrub and stunted eucalypts on Brooks Creek, Ordnance Point.

A total of 1 165 vertebrate animals was collected and registered into the collections of the Queen Victoria Museum. In addition a significant quantity of invertebrate and botanical material was collected and observations recorded. These collections and observations also produced data on distributional range and with many species considerably extended the previously known limits of their distribution.

Much of the work was carried out under adverse conditions as high wind and rain, particularly during the latter part of the expedition, often made the tasks of collecting and processing both difficult and unpleasant. It is therefore to the credit of all the participants that their dedication and interest in their respective tasks produced such useful results.

THE VEGETATION OF ORDNANCE POINT, NORTH-WESTERN TASMANIA

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Vegetation

The country around Brooks Creek consists of undulating land covered with heath and scrub (Plate 4). Trees are small, seldom exceeding six metres and are largely confined to valleys, sheltered hillsides and depressions (Plates 3 and 5). This appears to be the effect of wind and fire. There are many rocky outcrops of quartzite up to 20 metres high.

Close to the coast the scub is wind-pruned to an even blanket of vegetation but grassy openings occur between boulders and outcrops (Plates 6 and 7).

Plate 4
Looking south over coastal scrub from near Greenes Creek with Sandy Cape in the distance (top right).

Plate 5
Looking south about 3km inland from Greenes Creek. The eucalypts are progressively taller and more robust in the valleys and with increasing distance from the coast.

Plate 6
High tide zone and foreshore at Smiths Gulch showing windswept vegetation and grassy openings. Various shore birds, pipits, skylarks, chats and parrots *Neophema* spp. were regularly found here.

In such areas the bushes hug the rocks and are wind-pruned so that they follow the shape of the boulders.The soil appears to be derived from wind-blown sand accumulated against the coastal rocks, giving an even rolling appearance to the landscape. In the hollows peaty swamps occur (Plate 8) and many small streams wind through the scrub heath and sedgeland.

Although there were active sand dunes at Ordnance Point (Plate 2) and south of Greenes Point, the study area generally had a closed vegetation cover.

Plate 7
Looking south from Gannet Point over the intertidal zone at Smiths Gulch. At top left, cattle can be seen moving south along the coastal track.

Basis of Survey

The survey is the result of 12 days collecting from 21 March to 3 April 1981 in the vicinity of Ordnance Point. Short trips were made from the base camp at Brooks Creek. Most surveys were linear, in that plants were recorded, and collected if suitable, from a series of walks radiating from the camp. The routes were chosen to give a good sampling of habitats, with differing conditions of aspect, drainage and exposure to wind.

Plate 8
A dry lagoon surrounded by tea-tree behind Ordnance Point, a favoured feeding area for wallabies, pademelons, native hens and other fauna. The influence of prevailing westerly wind is clearly evident in the vegetation (top left).

Some areas were studied in detail, six 3m x 3m quadrants were investigated, listing every species of higher plant which could be identified within the plot. Other larger but still small areas with natural boundaries were treated similarly; these included several rocky outcrops, the dry bed of a swamp, three rocky semi-islands and a sand hill, which became an island at high tide.

Detailed studies were made of short lengths along watercourses, and in a radius of 30 metres around the Dawson River bridge where nearly all species were listed. Linear surveys were made along the coast, along the track from Dawson River bridge to the mouth of Symes Creek and south from there to the houses near Gannet Point.

A survey of inland heath towards Proudfoot Creek was commenced but aborted due to heavy rain.

General

Although the vegetation type was always coastal scrub heath, there were minor differences in communities due to differences in aspects, drainage, exposure and fire frequency. The year preceding the survey had been extremely dry and in some exposed sites, particularly on ridges, several species including *Sprengelia incarnata* and *Aotus ericoides* had died.

Some parts of the heath had been burnt within the last two years, and some areas were still charred and blackened. The regenerating vegetation consisted of a few herbaceous plants and regrowth shoots from the bases of plants like Melaleuca and Leptospermum.

Cattle were grazing within the area, but seemed to prefer the wetter parts of the range. Some pasture weeds, grasses and clovers had been introduced but the number seemed very low and confined to roadsides and areas with short introduced grass.

Because the survey was made in late autumn, most of the plants were in the non-flowering state. Annuals and spring-flowering perennials in most cases had died down. Most herbaceous Compositae had only leaves and the remains of dead flower heads and so could not be identified beyond genus level. Nevertheless about 80 specimens were collected, dried and mounted. These are stored in the herbarium of the Queen Victoria Museum.

Unusual plants, new forms and infrequently collected species have also been lodged in the Tasmanian Herbarium, Hobart.

Results of the Survey

The most interesting facts to emerge from the survey were the widespread occurrence of *Phyllota diffusa*, *Lycopodium serpentinum*, *Epacris serpyllifolia* in heaths and of *Beyeria leschenaultii* along the coast near Symes Creek.

A very vigorous form of *Spyridium vexilliferum* with wide leaves and prostrate habit was recorded from rocky areas near Brooks Creek and on the coastal stabilised dunes and hillsides from the mouth of Symes Creek to the Dawson River mouth.

The red-berried form of Billardiera at present included in *Billardiera longiflora* was found only on the rocky outcrops around Brooks Creek but plants of the blue-fruited form occurred along creeks.

A form of *Helichrysum dendroideum* with short blunt leaves, previously reported from near Greenes Creek by the Lands Department warden, Mr. F. J. Hanson, was found to occur in very limited quantities in wet conditions near Brooks Creek.

Leucopogon lanceolatus was widespread and frequent in scrubby heaths around Brooks Creek, Dawson River and Symes Creek. Until recently this plant was thought to occur mainly on King Island, although early records list it from the north-west coast. Failure to record this plant from the west coast probably occurred because it is easily confused in the non-flowering state with *Leucopogon parviflorus*, *L. australis* and *Monotoca glauca*, all of which were present also.

Until now it has been thought that *Phyllota diffusa* was confined to a small area near Scamander and near Sisters Beach. It appears to be very common in the study area.

Lycopodium serpentinum has been recognised in Tasmania only within the last 15 years, but appears to be widespread in coastal heaths, being known from Bakers Beach and several other places.

Beyeria leschenaultii is known to occur on Bass Strait islands (King, Flinders) but rarely on mainland Tasmania. It has been recorded from Waterhouse Beach, north-east Tasmania, in 1965 and from Temma in 1979, but was not considered to be common on the west coast; it covered a large area around Symes Creek.

Plant Records

Plants were recorded on each day's trip but records have been sorted to give lists of plants growing under similar definite conditions. They are grouped under the following headings:

1. Heaths around Brooks Creek — hillsides and semi-open country;
2. Coastal berry bush (*Cyathodes abietina*) shrubbery;
3. Shoreline — including grassed or turfed areas between rocks;
4. Semi-islands — rocky reefs which are islands at high tide;
5. Swamp beds;
6. Dawson River to Gannet Point;
7. Cursory survey towards Proudfoot Creek;
8. Heathland quadrats;
9. Rock outcrops.

Some of these areas are analysed in detail, namely:

1.1 Brooks Creek;
1.2 Along banks of Brooks Creek, sides and bed of watercourse;
2.1 Berry bush shrubbery;
2.2 Turf species between patches of *Cyathodes abietina* shrubbery;
5.1 Lagoons, just inland from Ordnance Point;
5.2 On raised bank of dry lagoon behind dunes, near Ordnance Point — the main lagoon recorded in 5.1;
6.1 Dawson River, near road bridge;
6.2 Dawson River, eastern side of road at bridge;
6.3 Track from Dawsons Creek bridge to mouth of Symes Creek;
6.4 Sand dune near mouth of Symes Creek;
6.5 Mouth of Symes Creek;
6.6 South from the mouth of Symes Creek towards Gannet Point;
9.1 Quartzite outcrop south of Brooks Creek;
9.1.1 Steep anti-clinal slope facing west, smooth rock with pockets of soil and moss;
9.1.2 Around base of outcrop;
9.1.3 North side similar to west, but also;
9.1.4 East facing slope with greater soil cover;
9.2 Small rocky outcrop north of Brooks Creek estuary.

1. Brooks Creek Hillsides

The main vegetation type of the gently rolling hills was heath or scrub-heath. In many places the vegetation was low, under half a metre. Along watercourses and where no fires had occurred for some years, scrub heath reached more than one metre. Small trees of *Eucalyptus nitida,* Leptospermum and Melaleuca, particularly *M. squarrosa* and *M. ericifolia* grew in sheltered positions. A very few small *Eucalyptus viminalis* occurred in rocky parts of the hillside. Nearly all Eucalypts were *E. nitida,* hardly reaching five metres and usually of mallee growth with several trunks. Many were heavily in fruit.

The following list includes plants from hillsides and wet peaty areas with buttongrass tussocks where there was run-off of water.

The following lists of species were made in the course of the study, carried out between 22 March and 2 April 1981.

1.1 Brooks Creek

Hillsides, heath, excepting rocky outcrops, lagoon bottoms and shoreline.

Angiospermeae
- Dilleniaceae
  - *Hibbertia fasciculata*
  - *H. sericea*
- Violaceae
  - *Viola hederacea*
- Tremandraceae
  - *Tetratheca pilosa*
- Geraniaceae
  - *Geranium solanderi*
- Rutaceae
  - *Eriostemon virgatus*
- Leguminosae
  - *Aotus ericoides*
  - *Bossiaea cinerea*
  - *Dillwynia glaberrima*
  - *Gompholobium huegelii*
  - *Kennedia prostrata*
  - *Phyllota diffusa*
  - *Platylobium triangulare*
  - *Pultenaea dentata*
  - *P. tenuifolia*
  - *Acacia myrtifolia*
  - *A. suaveolens*
  - *A. verticillata*
  - *A. verticillata var. ovoidea*
- Cunoniaceae
  - *Bauera rubioides*
- Droseraceae
  - *Drosera pygmoea*
- Myrtaceae
  - *Baeckea ramosissima*
  - *Eucalyptus nitida*
  - *E. viminalis*
  - *Leptospermum glaucescens*
  - *L. scoparium*
  - *Melaleuca ericifolia*
  - *M. squamea*
  - *M. squarrosa*
- Umbelliferae
  - *Centella cordifolia*
  - *Hydrocotyle sibthorpioides*
  - *H. tripartita*
- Rubiaceae
  - *Opercularia varia*
- Compositae
  - *Brachycome* spp.
  - *Helichrysum dealbatum*
  - *Senecio* sp. fireweed form
  - *Senecio hispidulus? depauperate*
- Stylidiaceae
  - *Stylidium graminifolium*

Lobeliaceae
Lobelia alata
Epacridaceae
Astroloma humifusum
Epacris impressa
E. lanuginosa
E. obtusifolia
E. serpyllifolia
Leucopogon australis
L. collinus
L. lanceolatus
L. parviflorus
L. virgatus
Monotoca empetrifolia
M. glauca
M. scoparia
Sprengelia incarnata
Styphelia adscendens
Gentianaceae
Centaurium australe
Convolvulaceae
Dichondra repens
Scrophulariaceae
Parentucellia viscosa
Lauraceae
Cassytha glabella
Proteaceae
Banksia marginata
Persoonia juniperina
Thymelaeaceae
Pimelea lindleyana
Euphorbiaceae
Amperea xiphoclada
Casuarinaceae
Casuarina monilifera
Cyperaceae
Cladium acutum
C. junceum
Gymnoschoenus sphaerocephalus
Lepidosperma concavum
L. filiforme or *carsei*
L. gladiatum
Leptocarpus tenax
Schoenus tenuissimus
S. turbinatus
Scirpus nodosus
Restionaceae
Hypolaena fastigiata
Restio complanatus
R. monocephalus
R. oligocephalus
R. tetraphyllus
Juncaceae
Juncus planifolius
J. pauciflorus
Centrolepidaceae
Centrolepis species, hairy leaves

Xyridaceae
Xyris muelleri
X. operculata
Xyris sp. (long, narrow leaves)
Liliaceae
Blandfordia punicea
Dianella revoluta
Drymophila cyanocarpa
Laxmannia sessilifloria
Stypandra caespitosa
Iridaceae
Patersonia glauca
Orchidaceae
Chiloglottis sp.
Pterostylis sp.
Eriochilus cucullatus
Pteridophyta
Gleicheniaceae
Gleichenia microphyllum
Lindsayaceae
Lindsaya linearis
Dennstaedtiaceae
Pteridium esculentum
Lycopodiaceae
Lycopodium deuterodensum
L. serpentinum
Selaginellaceae
Selaginella uliginosa
Bryophyta
Musci
Sphagnum sp.
No systematic collecting of Bryophytes was done.

1.2 Along Banks of Brooks Creek, Sides and Bed of Watercourse.

Angiospermae
Dilleniaceae
Hibbertia empetrifolia
Pittosporaceae
Billardiera longifloria (blue)
Rutaceae
Eriostemon virgatus
Zieria arborescens
Leguminosae
Bossiaea cinerea
Dillwynia glaberrima
Pultenaea daphnoides
Acacia mucronata
A. verticillata
Cunoniaceae
Bauera rubioides
Myrtaceae
Eucalyptus nitida
Leptospermum lanigerum

Compositae
Olearia phlogopappa
O. stellulata
Goodeniaceae
Goodenia ovata
Epacridaceae
Leucopogon australis
L. lanceolatus
Monotoca glauca
Labiatae
Ajuga australis
Cyperaceae
Cladium acutum
Lepidosperma filiforme
Restionaceae
Empodisma minus
Restio complanatus
Liliaceae
Dianella tasmanica
Drymophila cyanocarpa
Iridaceae
Patersonia glauca
Pteridophyta
Osmundaceae
Todea barbara
Gleicheniaceae
Gleichenia dicarpa
G. microphylla
Dennstaedtiaceae
Pteridium esculentum
Lindsayaceae
Lindsaya linearis
Aspidiaceae
Ruhmohra adiantiformis
Blechnaceae
Blechnum minus
B. wattsii
Bryophyta
Hepaticae
Four species, unidentified.
Musci
Sphagnum sp.

2. Coastal Berry Bush *(Cyathodes abietina)* Shrubbery

The berry bush *Cyathodes abietina* was the dominant plant in the wind-swept shrubberies close to the coast. This zone formed the seaward edge of the scrub heath. The plants would receive much spray and salt-laden air from the winter storms. The whole vegetation was dense and wind-pruned, sculptured to any standing rocks. The growth varied in height, reaching about one metre in some parts, but was usually less than this.

Between Brooks Creek and Smiths Gulch, the Cyathodes shrubbery was short with grassy patches between isolated clumps, probably due to human traffic, fire and grazing cattle. Further west towards Gannet Point, the shrubbery was better developed but still with

open grassy areas. On its landward side, this zone merged with many species of nectar-producing plants providing shelter and food for many faunal species.

2.1 Berry Bush Shrubbery

Cyathodes abietina, *Leptospermum scoparium* and *Acacia verticillata* as dominant species. Some quadrat surveys have been incorporated in the species list.

Angiospermae
- Dilleniaceae
  - *Hibbertia sericea*
- Caryophyllaceae
  - *Sagina* sp.
- Rutaceae
  - *Correa backhousiana*
- Rhamnaceae
  - *Spyridium vexilliferum*, prostrate form
- Leguminosae
  - *Aotus ericoides*
  - *Bossiaea cordigera*
  - *B. prostrata*
  - *Daviesia ulicifolia*
  - *Pultenaea tenuifolia*
  - *Acacia verticillata*, fine and broad leaved forms
- Rosaceae
  - *Acaena* sp. *(novae-zelandiae?)*
- Cunoniaceae
  - *Bauera rubioides*
- Crassulaceae
  - *Crassula sieberana*
- Haloragaceae
  - *Gonocarpus humilis* (formerly *Haloragis teucrioides)*
- Myrtaceae
  - *Leptospermum scoparium*
  - *L. glaucescens*
  - *Melaleuca ericifolia*
  - *M. squarrosa*
- Ficoideae
  - *Carpobrotus rossii*
- Umbrelliferae
  - *Centella cordifolia*
  - *Hydrocotyle sibthorpioides*
- Compositae
  - *Brachycome* sp.
  - *Helichrysum (apiculatum?)*
  - *H. bicolor* (dead)
  - *H. dendroideum*
  - *H. scorpioides*
  - *Hypochaeris radicata*
  - *Leptorhynchos squamatus*
  - *Nablonium calyceroides*
- Goodeniaceae
  - *Goodenia ovata*
- Lobeliaceae
  - *Lobelia alata*

Epacridaceae
Cyathodes abietina
Epacris impressa
Leucopogon collinus
L. lanceolatus
L. parviflorus
L. virgatus
Monotoca scoparia
M. glauca
Apocynaceae
Alyxia buxifolia
Proteaceae
Banksia marginata
Persoonia juniperina
Santalaceae
Exocarpos syrticola
Casuarinaceae
Casuarina monilifera
Gramineae
Poa (poiformis?)
Tetrarrhena distichophylla
Cyperaceae
Carex appressa
Cladium acutum
Centrolepidaceae
Centrolepis sp. (dead, no flowers)
Xyridaceae
Xyris sp. (long-leaved)
Iridaceae
Patersonia sp.
Juncaceae
Juncus planifolius
Luzula sp.
Liliaceae
Dianella revoluta
Lomandra longifolia
Orchidaceae
Eriochilus cucullatus
Pteridophyta
Dennstaedtiaceae
Pteridium esculentum
Selaginellaceae
Selaginella uliginosa

2.2 Turf Species Between Patches of *Cyathodes abietina* Shrubbery

Angiospermae
Violaceae
Viola hederacea
Geraniaceae
Pelargonium australe
Oxalidaceae
Oxalis corniculata
Rutaceae
Correa backhousiana

Leguminosae
Bossiaea prostrata
Pultenaea dentata
Rosaceae
Potentilla anserina
Myrtaceae
Leptospermum scoparium
Rubiaceae
Asperula sp.
Opercularia varia
Compositae
Brachycome angustifolia var. *angustifolia*
Hypochaeris radicata
Leptorhynchos squamatus
Nablonium calyceroides
Epacridaceae
Cyathodes abietina
Epacris impressa
Gramineae
Barb Grass
Danthonia sp.
Tetrarrhena distichophylla
Juncaceae
Juncus sp. - small, stiff
Hypoxidaceae
Hypoxis glabella
Pteridophyta
Selaginellaceae
Selaginella uliginosa
Fungi
Brown Mushroom

3. Shores and Grassy Turf Between Rocks

Cruciferae
Cakile maritima
Caryophyllaceae
Colobanthus apetalus
Geraniaceae
Pelargonium australe
Rutaceae
Correa backhousiana
Crassulaceae
Crassula sieberana
Ficoideae
Carpobrotus rossii
Disphyma australe
Umbrelliferae
Apium prostratum
Compositae
Brachycome angustifolia var. *angustifolia*
Calocephalus brownii
Helichrysum bicolor
Senecio spathulatus

Apocynaceae
Alyxia buxifolia
Myoporaceae
Myoporum insulare
Plantaginaceae
Plantago bellidioides
P. triantha
Chenopodiaceae
Atriplex billardieri
A. hastata
Chenopodium glaucum subsp. *ambiguum*
Hemichroa pentrandra
Rhagodia baccata
Gramineae
Agrostris (aemula?)
Poa poiformis
Juncaceae
Luzula flaccida

4. Rocky Islands and Emergent Reefs

Cruciferae
Cakile maritima
Geraniaceae
Pelargonium australe
Rutaceae
Correa backhousiana
Compositae
Calocephalus brownii
Senecio spathulatus
Ficoideae
Carpobrotus rossii
Disphyma australe
Umbelliferae
Apium prostratum
Chenopodiaceae
Atriplex billardieri
A. hastata
Chenopodium glaucum subsp. *ambiguum*
Hemichroa pentandra
Rhagodia baccata
Myoporaceae
Myoporum insulare
Gramineae
Agrostis sp.
Poa poiformis

5. Swamp Beds

Open dry swamps, dry lagoons, flats behind dunes. This list includes a detailed study made on 30 March 1981.

5.1 Lagoons, Just Inland from Ordnance Point

Angiospermae
- Leguminosae
  - *Trifolium* sp.
- Rosaceae
  - *Potentilla anserina*
- Haloragaceae
  - *Myriophyllum variaefolium*
- Onagraceae
  - *Epilobium hirtigerum*
- Lythraceae
  - *Lythrum hyssopifolia*
- Umbelliferae
  - *Centella cordifolia*
  - *Eryngium vesciculosum*
  - *Hydrocotyle tripartita*
  - *Lilaeopsis brownii*
- Compositae
  - *Cotula coronopifolia*
  - *Helichrysum scorpioides*
  - *Hypochaeris radicata*
  - *Nablonium calyceroides*
- Goodeniaceae
  - *Selliera radicans*
- Epacridaceae
  - *Leucopogon lanceolatus*
- Gentianaceae
  - *Nymphoides exigua*
- Scrophulariaceae
  - *Gratiola latifolia*
- Plantaginaceae
  - *Plantago coronopifolia*
- Polygonaceae
  - *Polygonum* sp. (not *Hydropiper*)
  - *Rumex* sp.
- Potamogetonaceae
  - *Potamogeton* sp.
- Juncaginaceae
  - *Triglochin procera*
  - *T. striata*
- Gramineae
  - *Agrostis avenacea*
- Cyperaceae
  - *Carex appressa*
  - *Schoenus nitens*
  - *Scirpus nodosus*
- Juncaceae
  - *Juncus articulatus*
  - *J. kraussii*
  - *J. procerus*

5.2 On Raised Bed of Dry Lagoon Behind Dunes, Near Ordnance Point
The main lagoon recorded in 5.1.

Dilleniaceae
Hibbertia sericea
Leguminosae
Acacia sophorae
Myrtaceae
Leptospermum lanigerum
Melaleuca ericifolia
M. squarrosa
Onagraceae
Epilobium sp.
Rubiaceae
Galium sp.
Epacridaceae
Cyathodes abietina
Convolvulaceae
Dichondra repens
Scrophulariaceae
Parentucellia viscosa
Chenopodiaceae
Rhagodia baccata
Proteaceae
Banksia marginata
Thymeliaceae
Pimelea drupacea
Santalaceae
Exocarpos syrticola
Cyperaceae
Lepidosperma concavum
Liliaceae
Dianella revoluta

6. Dawson River

A detailed study was made on 31 March 1981 around the road bridge. Nearly all plants within a radius of 30 metres were listed. There were several well-grown trees of *Eucalyptus nitida* with many fruits and small trees of *Acacia mucronata* beside the bridge. The vegetation was generally open heath with a few taller shrubs along the edge of the river.

Further studies were carried out along the track from Dawson River bridge to the mouth of Symes Creek, along the shore and thence along the dunes and hillsides to the mouth of the Dawson, and on towards Gannet Point.

6.1 Dawson River, Near Road Bridge
North-west side of bridge within 50 metres of it.

Angiospermae
Leguminosae
Aotus ericoides

Dillwynia glaberrima
Phyllota diffusa
Pultenaea juniperina
Acacia mucronata
Cunoniaceae
Bauera rubioides
Haloragaceae
Gonocarpus humilis
Myrtaceae
Eucalyptus nitida
Leptospermum glaucescens
L. scoparium
Melaleuca squarrosa
Rubiaceae
Opercularia varia
Umbelliferae
Hydrocotyle sibthorpioides
Lobeliaceae
Lobelia alata
Epacridaceae
Epacris impressa
E. lanuginosa
Leucopogon australis
L. collinus
Monotoca glauca
Sprengelia incarnata
Lauraceae
Cassytha glabella
Casuarinaceae
Casuarina monilifera
Gramineae
Tetrarrhena distichophylla
Cyperaceae
Cladium acutum
Gymnoschoenus sphaerocephalus
Lepidosperma concavum
L. filiforme
Leptocarpus sp.
Schoenus tenuissimus
Juncaceae
Juncus planifolius
Restionaceae
Empodisma minus
Hypolaena fastigiata
Restio complanatus
R. tetraphyllus
Centrolepidaceae
Centrolepis sp.
Orchidaceae
Caladenia sp. (dead remains)
Pteridophyta
Osmundaceae
Todea barbara

Gleicheniaceae
Gleichenia dicarpa
Sticherus tener
Lindsayaceae
Lindsaya linearis

6.2 Dawson River, Eastern Side of Road at Bridge

The vegetation on the eastern side of the bridge was very similar but the following additional plants occurred within 20 metres of the bridge.

Rutaceae
Eriostemon virgatus
Leguminosae
Acacia myrtifolia
Myrtaceae
Melaleuca squamea
Umbelliferae
Xanthosia pusilla
Epacridaceae
Leucopogon virgatus
Cyperaceae
Scirpus fluitans in creek
S. nodosus

6.3 Track From Dawsons Creek Bridge to Mouth of Symes Creek

The track passed through scrubby heath, part of which had been burnt within the last year, then through more open short heathland to open sand, turf and vegetated dunes. Cattle were grazing. The following plants were seen:

Angiospermae
Dilleniaceae
Hibbertia fasciculata
H. sericea
Rhamnaceae
Spyridium vexilliferum (prostrate form)
Leguminosae
Aotus ericoides
Phyllota diffusa
Platylobium triangulare
Pultenaea daphnoides
Acacia sophorae
A. verticillata
A. verticillata var. ovoidea
Myrtaceae
Eucalyptus nitida
Leptospermum glaucescens
L. scoparium
Onagraceae
Epilobium sp. (glabrous)

Stylidiaceae
Stylidium graminifolium
Epacridaceae
Cyathodes abietina
Epacris impressa
Leucopogon australis
L. lanceolatus
Monotaca empetrifolia
M. glauca
Santalaceae
Exocarpos sp.
Leptomeria drupacea
Euphorbiaceae
Beyeria leschenaultii
Gramineae
Aira caryophyllea
Cyperaceae
Lepidosperma concavum
Restionaceae
Restio complanatus
Pteridophyta
Dennstaedtiaceae
Pteridium esculentum

6.4 Sand Dune Near Mouth of Symes Creek

Surrounded by water at high tide.

Rutaceae
Correa backhousiana
Leguminosae
Acacia mucronata
A. sophorae
Rosaceae
Acaena sp.
Onagraceae
Epilobium sp.
Ficoideae
Carpobrotus rossii
Compositae
Brachycome sp. (blue, like *B. stricta*)
Helichrysum apiculatum
Olearia lepidophylla
Sonchus megalocarpus
Epacridaceae
Astroloma humifusum
Cyathodes abietina
Leucopogon parviflorus
Convolvulaceae
Dichondra repens
Scophulariaceae
Veronica calycina
Plantaginaceae
Plantago bellidioides

Thymelaeaceae
Pimelea glauca
Euphorbiaceae
Beyeria leschenaultii
Gramineae
Ammophila arenaria
Cyperaceae
Scirpus nodosus

6.5 Mouth of Symes Creek

Fore-dune, shore-line, vegetated sand hills.

Cruciferae
Cakile maritima
Geraniaceae
Geranium solanderi
Rhamnaceae
Spyridium vexilliferum - prostrate form
Leguminosae
Pultenaea tenuifolia
Onagraceae
Epilobium sp.
Umbelliferae
Apium prostratum
Lilaeopsis brownii
Compositae
Calocephalus brownii
Hypochaeris radicata
Sonchus megalocarpus
Lobeliaceae
Lobelia alata
Epacridaceae
Leucopogon australis
L. lanceolatus
L. parviflorus
Monotoca scoparia
Primulaceae
Samolus repens
Convolvulaceae
Dichondra repens
Scrophulariaceae
Veronica sp.
Labiatae
Ajuga australis
Chenopodiaceae
Atriplex billardieri
Thymelaeaceae
Pimelea glauca
Euphorbiaceae
Beyeria leschenaultii
Cyperaceae
Lepidosperma gladiatum
Schoenus nitens
Juncaceae
Luzula sp.

6.6 South From the Mouth of Symes Creek Towards Gannet Point

The most noticeable changes in vegetation were the presence of large areas of *Beyeria leschenaultii* on the seaward slopes and the frequent bushes of *Spyridium vexilliferum* on the tops and inland side of the sand ridges running parallel with the shore. At Brooks Creek, *Spyridium vexilliferum* was found on rocky outcrops rather than on sand.

There were occasional open, turfed slopes facing the sea and sandy areas with the remains of herbaceous species but the season was too late for their proper identification. *Leucopogon lanceolatus* occurred frequently with *Monotoca scoparia* and *Leucopogon australis*. Some larger trees of *Banksia marginata* and *Eucalyptus nitida* grew in sheltered hollows. The weather became too wet for further detailed work here.

7. Cursory Survey of Inland Heath Towards Proudfoot Creek

This was abandoned due to adverse weather conditions. The heath led into a forested zone where the main trees were *Eucalyptus obliqua* with *Casuarina littoralis*, neither of which had been seen at Brooks Creek; the heath composition was slightly different also.

Angiospermae
- Leguminosae
  - *Aotus ericoides*
  - *Dillwynia sericea*
  - *Pultenaea dentata*
  - *P. juniperina*
  - *Acacia suaveolens*
- Myrtaceae
  - *Eucalyptus obliqua*
  - *Leptospermum scoparium*
- Epacridaceae
  - *Epacris impressa*
  - *E. serpyllifolia*
  - *Leucopogon australis*
  - *L. collinus*
  - *Sprengelia incarnata*
- Lauraceae
  - *Cassytha glabella*
- Proteaceae
  - *Banksia marginata*
  - *Lomatia tinctoria*
- Casuarinaceae
  - *Casuarina littoralis*
- Cyperaceae
  - *Gahnia grandis*

8. Heathland Quadrats

A detailed study was made of an area of heathland about 3km inland from Greenes Creek and about 3km from the camp. Three quadrats of side 3m were drawn out in a portion of heath where a small swamp, almost dry at this season, occupied a basin-like depression and formed the head of a very small stream.

The quadrats were placed so that quadrat A was on the dry hill-slope which faced south-west, quadrat B on the edge of the basin at the junction of swamp and dry land, and quadrat C on the bed of the swamp.

The results of this survey are shown in table form.

	A Hillside	**B** Swamp Edge	**C** Swamp Bed
Angiospermae			
Tremandraceae			
Tetratheca pilosa	+	+	-
Rutaceae			
Eriostemon virgatus	+	+	-
Leguminosae			
Aotus ericoides	+	+	-
Papilionatae			
Dillwynia glaberrima	+	-	-
Phyllota diffusa	+	-	-
Bossiaea cinerea	-	+	-
Cunoniaceae			
Bauera rubioides	+	+	-
Myrtaceae			
Leptospermum glaucescens	+	+	-
Leptospermum scoparium	+	+	-
Melaleuca squarrosa	-	+	+
Stylidiaceae			
Stylidium graminifolium	+	-	-
Epacridaceae			
Epacris impressa	+	+	-
E. serpyllifolia	-	+	+
Leucopogon collinus	+	+	-
L. ericoides	-	+	-
Monotoca scoparia var. submutica	+	-	-
Sprengelia incarnata	+	+	+
Lauraceae			
Cassytha glabella	+	+	+
Proteaceae			
Banksia marginata	+	+	-
Euphorbiacae			
Amperea xiphoclada	+	-	-
Casuarinaceae			
Casuarina monilifera	+	-	-

Cyperaceae			
Cladium junceum	+	+	-
Gymnoschoenus sphaerocephalus	-	+	+
Lepidosperma concavum	+	-	-
Leptocarpus brownii	-	+	-
Schoenus tenuissimus	-	+	-
Restionaceae			
Empodisma minus	-	+	-
Hypolaena fastigiata	+	-	-
Restio complanatus	-	+	+
R. monocephalus	-	+	-
R. tetraphyllus	-	-	+
Liliaceae			
Laxmannia sessiliflora	+	-	-
Blandfordia punicea	-	+	-
Iridaceae			
Patersonia glauca	+	-	-
Bryophyta			
Sphagnaceae			
Sphagnum sp.	-	-	+
Pteridophyta			
Selaginellaceae			
Selaginella uliginosa	+	+	+
Number of species	23	24	9
Bare ground	30%	<30% partially submerged in winter	unknown submerged in winter

In quadrat A, the most frequent plants were *Hypolaena fastigiata, Sprengelia incarnata* and *Leucopogon collinus,* in quadrat B no plant was truly dominant, while in quadrat C the order of dominance was *Gymnoschoenus sphaerocephalus, Melaleuca squarrosa* and *Sprengelia incarnata,* closely followed by *Epacris serpyllifolia.*

Although the swamp offers habitat for fewer species, the number recorded may be lowered by the seasonal dying down under the drought conditions.

In the same locality, but outside the areas plotted, were *Lomandra longifolia, Pultenaea tenuifolia, Persoonia juniperina, Pimelea (stricta?), Eriochilus cucullatus* and *Lycopodium deuterodensum.* The hillside Eucalypts were *Eucalyptus nitida.*

9. Rock Outcrops

A similar intensive survey was made of a small rock outcrop near Ordnance Point in order to see whether there were any significant changes in vegetation with changes of aspect, and whether any species appeared to be restricted to such areas.

This survey was left until last so that earlier work could be taken into consideration.

9.1 Quartzite Outcrop South of Brooks Creek

9.1.1 Steep Anti-clinal Slope Facing West, Smooth Rock with Pockets of Soil and Moss

Angiospermae
- Dilleniaceae
  - *Hibbertia sericea*
- Pittosporaceae
  - *Billardiera longiflora*
- Geraniaceae
  - *Pelargonium australe*
- Oxalidaceae
  - *Oxalis corniculata*
- Rutaceae
  - *Correa backhousiana*
- Leguminosae
  - *Aotus ericoides*
  - *Daviesia ulicifolia*
  - *Acacia verticillata var. ovoidea*
- Myrtaceae
  - *Leptospermum glaucescens*
  - *L. scoparium*
  - *Melaleuca ericifolia*
- Ficoideae
  - *Carpobrotus* sp.
- Compositae
  - *Brachycome* sp. ca: 30cm high, flowers dead
- Epacridaceae
  - *Cyathodes abietina*
  - *Monotoca scoparia*
- Primulaceae
  - *Anagallis arvensis*
- Gentianaceae
  - *Centaurium* sp.
- Protaeceae
  - *Banksia marginata*
- Casuarinaceae
  - *Casuarina monilifera*
- Gramineae
  - *Agrostis* sp.
  - *Catapodium marinum*
  - *Danthonia* sp.
- Liliaceae
  - *Dianella revoluta*
- Orchidaceae
  - *Acianthus reniformis*

Pteridophyta
- Polypodiaceae
  - *Microsorium diversifolium*

9.1.2 Around Base of Outcrop

Myrtaceae
Eucalyptus nitida
Compositae
Nablonium calyceroides
Epacridaceae
Leucopogon parviflorus
Cyperaceae
Lepidosperma (concavum?)
Liliaceae
Dianella sp.

9.1.3 North Side Similar to West, But Also:

Violaceae
Viola hederacea
Leguminosae
Pultenaea tenuifolia
Acacia sophorae

9.1.4 East Facing Slope With Greater Soil Cover

Angiospermae
Dilleniaceae
Hibbertia sericea
Oxalidaceae
Oxalis corniculata
Leguminosae
Acacia sophorae
A. verticillata var. ovoidea
Myrtaceae
Eucalyptus nitida
Melaleuca ericifolia
Onagraceae
Epilobium sp.
Epacridaceae
Leucopogon parviflorus
Rubiaceae
Galium sp.
Compositae
Brachycome sp.
Gnaphalium sp.
Campanulaceae
Wahlenbergia sp.
Convolvulaceae
Dichondra repens
Proteaceae
Banksia marginata
Santalaceae
Exocarpos syrticola

Gramineae
Aira caryophylla
Juncaceae
Luzula sp.
Bryophyta
Hepaticae
Lunaria sp.?

It has been noted that a greater number of herbaceous species had survived to late autumn on the side with deeper soil.

9.2 Small Rocky Outcrop North of Brooks Creek Estuary

Pittosporaceae
Billardiera longiflora (red-fruited)
Rhamnaceae
Pomaderris apetala
Spyridium vexilliferum, prostrate form
Leguminosae
Daviesia ulicifolia
Dillwynia glaberrima
Platylobium triangulare
Crassulaceae
Crassula sieberana
Myrtaceae
Leptospermum glaucescens
Melaleuca squamea
Compositae
Brachycome sp. (medium size)
Nablonium calyceroides
Epacridaceae
Cyathodes abietina

On this outcrop the surface was gently sloping with small pockets of soil but the vegetation covered a much higher proportion of rock than on the previous outcrop studied. There were many more shrubby species than herbaceous species.

Due to insufficient time in the field, the results are insufficient to show changes with aspect. The red-fruited *Billardiera longiflora* appeared only on rocky areas, occurring three times, and it is known at Rocky Cape in similar situations.

Summary

Only three species of Eucalypt were seen, the most widespread and common being *E. nitida*. *Eucalyptus obliqua* occurred in the Proudfoot forest and *E. viminalis* very occasionally in the heath. None grew to any height within the study area.

In other genera, the known distribution of several species was increased, especially of *Beyeria leschenaultii, Phyllota diffusa, Lycopodium serpentinum* and red-berried *Billardiera longiflora*.

An unusual wide-leaved prostrate form of *Spyridium vexilliferum* was found to be common.

The known locations of plants of short-leaved form of *Helichrysum dendroideum*, which occurred sporadically, were increased. More detailed study is needed on this plant.

Further surveys are needed, especially in spring to enable the flowering of ephemerals, annuals, Orchidaceae and other spring-flowering perennials about whose occurrence little is known to be observed. Indeed much more detailed work should be done before pasture weeds become widespread. Many hundreds of people visit or pass through the area every summer, and cattle are agisted on the coastal heaths so that it is most desirable to find out as much about the vegetation before increasing use causes deleterious changes.

THE FAUNA OF ORDNANCE POINT, NORTH-WESTERN TASMANIA

R. H. Green
Curator of Zoology, Queen Victoria Museum

Mammals

Collecting was undertaken by trapping with commercial break-back snap traps baited with bread and peanut butter on about 3 000 trap nights and with wire cage traps baited with bread and peanut butter, apple, or meat on about 200 trap nights. These were set on or near the runways and beneath low vegetation in various habitats but principally in the wet sedgeland-heath areas where small mammals appeared to be most numerous.

Metal cage traps were set for Tasmanian Devils on 216 trap nights as part of a local population study of this species.

Spotlight observations were made by walking and from vehicles on numerous occasions and some mammals were collected by shooting.

A total of 122 specimens representing 14 species were collected.

Systematic List

Brush Wallaby *Macropus rufogriseus*

Common throughout the area and often seen by day, grazing on the edge of clearings or travelling across open areas of heath and button grass.

Pademelon *Thylogale billardierii*

Abundant in all areas of teatree and dense scrub, from which it emerged at dusk to feed in grassy clearings and dry lagoons.

Brush-tailed Possum *Trichosurus vulpecula*

Apparently absent from the area, although it is known to occur in forests inland and to the north. Considerable time was spent on spotlight searches and in looking for footprints and faeces but no evidence of its presence was found.

Common Ringtail *Pseudocheirus peregrinus*

Uncommon and confined to the dense teatree and tall scrub. A party of three was found living near the campsite at Brooks Creek and an occupied nest and several deserted nests were found in nearby patches of scrub.

Common Wombat *Vombatus ursinus*

Common throughout the area. A few were regularly seen grazing in the grassy clearings when spotlighting at night and numerous wombat burrows were found. A female was found supporting a large pouch young in the first week of March.

In March, when the lagoons were still dry and surface water was scarce, wombats were found to have excavated several drinking holes on the beach at Ordnance Point. These were about 30cm across and 30cm deep and had been dug in the sand at about high tide line. In the bottom of each hole was about a litre of clear brackish water. They appeared to be of a very temporary nature as footprints indicated that they has been excavated and used by only one animal and their position on the beach would result in their being awash at high tide. Somewhat similar diggings were found in the dry lagoons following the first autumn rains.

Brown Bandicoot *Isoodon obesulus*

Uncommon. It was seen on several occasions when spotlighting and two were caught in wire cage traps, baited with bread and peanut butter, set on the edge of tracks and clearings.

Tiger Cat *Dasyurus maculatus*

Uncommon. One was seen crossing a grassy clearing behind the coastal sand dunes at Ordnance Point when spotlighting and two were caught in sheet metal and wire cage traps set primarily for Tasmanian Devils.

Tasmanian Devil *Sarcophilus harrisii*

Common throughout the area. Sheet metal and wire cage traps were set for a total of 216 trap nights, from 8 March to 22 April, during which time 20 individuals were caught, dye marked and released. Fifteen recaptures from those animals were recorded in the same period. Further details of this population are presented by Lazell (pages 53-56).

Swamp Antechinus *Antechinus minimus*

Common and widely distributed. Sample trapping with commercial break-back traps baited with bread and peanut butter for about 3 000 trap nights produced 22 individuals. It was found living in wet areas where there was a good ground cover of sedge and heath, where the Swamp-rat *Rattus lutreolus* was also found to be common. Traps were set mostly on runways beneath the vegetation and animals were caught when apparently attracted to the bait or by running over the traps. Some were caught in semi-exposed sites and diurnal catches were often made.

Sub-adults were well advanced, the smallest captured weighing 27gm. The sex ratio was approximately equal. No old post-breeding males could be discerned but seven post-breeding females were caught. Lactation was completed in each instance, with four to six nipples having been suckled.

White-footed Dunnart *Sminthopsis leucopus*

A male (wt. 19gm, head and body 100mm) was caught in a pit-fall trap amongst bracken fern on sand dunes at Ordnance Point on 12 April and a male (wt. 25gm, head and body 98mm) was caught in a break-back trap set under a log in thick scrub beside Brooks Creek on 23 April.

Eastern Swamp-rat *Rattus lutreolus*

Common and widely distributed, favouring wet sedgeland, heath and teatree where it forms extensive runway systems beneath the vegetation. In some areas these runways were found to extend onto adjacent, semi-exposed ground, for up to 20 metres from cover, as if to provide access routes to feeding areas amongst the fine grasses. Trapping with commercial break-back traps baited with bread and peanut butter produced 44 swamp-rats in about 3 000 trap nights. The ratio of sexes was about equal and the population contained many sub-adults. No pregnant or lactating females were found but some had fur wear around their nipples and enlarged mammary glands indicating young had been recently weaned.

Pelage colour was strikingly variable, some individuals lacking the sandy yellow fur tip and appearing almost black dorsally while on others it was prounounced, producing a tan-brown effect. This colour variation did not appear to be an age characteristic.

Ship Rat *Rattus rattus*

Eight were caught in the course of the sample trapping for small mammals. At Brooks Creek they were found living around lagoons and drainage areas and some were disturbed from the dense upper foliage of tall teatrees. An exceptionally large black male (wt. 230gm) was trapped amongst dry heath. Near Greenes Creek one was trapped amongst poa grass and rocks above high tide.

From 3 to 11 April, a member of the party camped near the Thornton River and trapped in wet sclerophyll about 2km inland, an area not used by campers and rarely visited. In about 50 trap nights four were caught comprising two blacks, one grey-bellied grey and one cream-bellied gray.

Water Rat *Hydromys chrysogaster*

Common along the coast and in estuaries. Two were trapped in wire cage traps baited with raw fish and set on the edge of the tidal lagoon at Brooks Creek. Footprints in the sand were commonly found near the water's edge.

Broad-toothed Rat *Mastacomys fuscus*

Common in the wet sedgeland and heath where ground cover was sufficiently dense to provide shelter over its runways. Best populations were found several kilometres inland in valleys and in the wetter, drainage areas. Thirteen were trapped in the course of sample trapping for small mammals. Sub-adults and adults were included but no pregnant or lactating females were found. Some females showed signs of having recently suckled young. Testes regression in the adult males was well advanced.

Long-tailed Rat *Pseudomys higginsi*

Common in the wet sclerophyll gullies and along the heavily vegetated creeks which run from the dense inland forests to the coast. Three were trapped in such sites along the banks of Brooks Creek and four near the Thornton River. All were adult animals and their nipple and teste condition indicated that breeding had finished and young were weaned.

House Mouse *Mus musculus*

Common throughout the area, being trapped in dry heathland, beneath stunted eucalypts and about the camping areas. At Brooks Creek it entered the tents, by chewing through the fabric, to feed on the stores. All appeared adult and none were found to be pregnant or lactating.

Bats

Small bats were seen on several occasions, flying at dusk, at Brooks Creek and near the Thornton River but as none were collected their identity could not be determined.

Feral Cat *Felis catus*

One was caught in a cage trap baited with raw fish at Brooks Creek but no indication of the presence of others was found.

Echidna *Tachyglossus aculeatus*

None were found in the area but diggings consistent with those of echidnas were seen on several occasions. From enquiries of visitors and others familiar with the fauna of the area, it appears that echidnas are occasionally seen.

Elephant Seal *Mirounga leonina*

An adult female was found resting on beachwashed kelp at Greenes Creek on the morning of 13 March. Upon being approached, she retreated into the sea and apparently left the area.

Birds

Collecting was undertaken by mistnetting and shooting. Netted birds not required for collections were banded before release. Observations were made as opportunity prevailed and regular searches were made along the coast for Orange-bellied Parrots and sea birds. Binoculars and (on one visit) a powerful telescope were used as visual aids. A total of 174 specimens representing 40 species were collected.

Systematic List

Little Penguin *Eudyptula minor*

One, apparently sick, was found on the beach at Ordnance Point and several beachwashed carcases were found in the vicinity.

Black-browed Albatross *Diomedea melanophrys*

A few were observed, with the aid of a telescope, flying well out to sea during the first week in March.

Shy Albatross *Diomedea cauta*

Regularly observed and on some occasions it was estimated, with the aid of a telescope, that up to 100 could be seen from Ordnance Point, flying well out to sea.

Giant Petrel *Macronectes* sp.

The desiccated remains of a brown bird was found at Smiths Gulch.

Cape Petrel *Daption capense*

One was observed, with the aid of a telescope, flying well out to sea on 6 March.

Short-tailed Shearwater *Puffinus tenuirostris*

On most days, many thousands could be seen on the horizon, the flocks moving north or south. In April the number of birds was notably less than in March.

It breeds on islands off the north-west and the south-west of Tasmania and the birds at Ordnance Point may well have come from either of these areas.

Fluttering Shearwater *Puffinus gavia*

A few birds, believed to be this species, were seen with the aid of a telescope, on several days during the first week of March.

Australian Pelican *Pelecanus conspicillatus*

A single bird was seen on Sandy Cape Beach on two occasions in March.

Australian Gannet *Morus serrator*

Up to 20 could be seen with the aid of binoculars on most days. Usually they were feeding well out to sea but occasionally some flew into sheltered bays where they were seen diving.

Black-faced Shag *Leucocarbo fuscescens*

A few were often seen on off-shore rocks, usually in pairs or small parties.

Great Cormorant *Phalacrocorax carbo*

A few were seen in the area, usually as lone individuals flying along the coast or resting on off-shore rocks.

Little Pied Cormorant *Phalacrocorax melanoleucos*

Up to 20 were living in the general area and smaller numbers were often seen fishing in sheltered waters or resting on off-shore rocks.

White-faced Heron *Ardea novaehollandiae*

Regularly seen alone or in small parties, feeding in the intertidal zone. About 10 were living in the general area. They were sometimes seen flying inland at dusk, as if going to roost.

Cattle Egret *Ardeola ibis*

From one to four were seen on most days between 26 March and 19 April. They were living on the grassy clearings and dry lagoons where cattle were grazing and they occasionally rested on the cattle's backs.

Black Swan *Cygnus atratus*

From two to five were seen on several occasions on the lagoons and river estuaries behind Sandy Cape Beach.

Australian Shelduck *Tadorna tadornoides*

Two were seen on Sandy Cape Beach on 27 March.

Pacific Black Duck *Anas superciliosa*

Often seen on estuaries, coastal lagoons, tidal pools and patches of decaying kelp. Up to 60 were found on estuaries on Sandy Cape Beach on 4 March and lesser numbers on other occasions.

Chestnut Teal *Anas castanea*

Up to 40 were present on estuaries on Sandy Cape Beach on 9 March and lesser numbers were often seen on lagoons and tidal pools on other occasions. None were observed after April 1.

Australasian Shoveler *Anas rhynchotis*

Four were seen on a lagoon behind Sandy Cape Beach on 2 March.

Brown Goshawk *Accipiter fasciatus*

Ten single sightings were made on nine days between 3 March and 1 April. These were mostly of transitory individuals.

White-bellied Sea-eagle *Haliaeetus leucogaster*

One was seen on several occasions in March in the vicinity of Sandy Cape Beach.

Wedge-tailed Eagle *Aquila audax*

Two were seen fairly regularly in the general area.

Marsh Harrier *Circus aeruginosus*

Eight were seen between 2 March and 1 April. These appeared to be migrating birds moving northwards along the coast.

Peregrine Falcon *Falco peregrinus*

Sightings of a single bird were made on 3 and 6 March.

Australian Hobby *Falco longipennis*

Sightings of a single bird, believed to be of this species, were recorded on 3 and 5 March.

Brown Falcon *Falco berigora*

Two were regularly seen in the general area.

Swamp Quail *Coturnix ypsilophora*

Bevies of up to six birds were flushed from areas of bracken fern and heath on about ten occasions.

Lewin's Rail *Rallus pectoralis*

One was flushed from a waterlogged area of heath and button-grass, about 2km north-east of Greenes Point.

Tasmanian Native-hen *Gallinula mortierii*

Regularly seen in parties of five to ten, often in the vicinity of small, dry lagoons and grassy areas where they found suitable grazing. When disturbed they retreated to the protection of the nearby teatree scrub.

Pied Oystercatcher *Haematopus longirostris*

Regularly seen on sandy beaches, usually in pairs. A half-grown young was found on Ordnance Point in the first week of March. The population between Gannet Point and Sandy Cape was about 20.

Sooty Oystercatcher *Haematopus fuliginosus*

Regularly seen on sandy beaches and rocky shores, usually in pairs. About ten were living between Gannet Point and Sandy Cape.

Masked Lapwing *Vanellus miles*

About 30 were living along the coast, between Gannet Point and Sandy Cape, usually occurring in pairs or small parties on beaches or dry lagoons. They were sometimes seen flying over water when moving along the coast and occasionally rested on off-shore rocks.

Hooded Plover *Charadrius rubricollis*

A flock of about 20 was found living on the beach at Ordnance Point in the first week of March. This increased to about 40 by April. Lesser numbers were seen in pairs and small parties on Sandy Cape Beach. About 20% were in sub-adult plumage and lacked the black cap. A young, about one week old, was found on Ordnance Point in the first week of March.

Double-banded Plover *Charadrius bicinctus*

Ten to 20 were living on the beach on Ordnance Point in March and April, generally in association with Hooded Plovers. All were in eclipse (winter) plumage. Lesser numbers were seen on Sandy Cape Beach.

Red-capped Plover *Charadrius ruficapillus*

About 10 were living on the beach at Ordnance Point and pairs and small parties were found on most other beaches. The greatest number counted on one day was 65, between Gannet Point and Pedder River estuary.

Banded Stilt *Cladorhynchus leucocephalus*

Four were found feeding in the shallow water of a lagoon at the estuary of the Wild Wave River in the first week of March. On 26 March 10 were found in the same area. Two were seen on the beach at Greenes Creek on 21 April. All were in immature plumage, lacking the reddish-brown breast band.

Ruddy Turnstone *Arenaria interpres*

Not seen until 23 March when 25 were found on Ordnance Point. Subsequently their number fluctuated, reaching a peak of about 100 on 18 April. Only two were present on 23 April. All appeared to be in eclipse (winter) plumage.

Red-necked Stint *Calidris ruficollis*

Five were found on the beach on Ordnance Point on 5 March.

Arctic Jaeger *Stercorarius parasiticus*

Three were seen, with the aid of a telescope, seawards from Ordnance Point on 12 March.

Silver Gull *Larus novaehollandiae*

In the first week of March the daily counts ranged beween 50 and 200. By the last week of March its number had noticably declined and by 23 April as few as five birds a day were being recorded in the vicinity of Ordnance Point. Their departure paralleled the deteriorating weather conditions at that time and illustrates a significant nomadic or migratory movement.

Pacific Gull *Larus pacificus*

Daily counts revealed a significant autumn exodus, paralleling that of the Silver Gull. From 1 to 12 March up to 40 were recorded in the general area. Between 22 March and 2 April the most seen on any day was 10 and from 12 to 23 April the most for any day was only four. Both sub-adult and adult birds were represented in the population.

Caspian Tern *Hydroprogne caspia*

One was seen on 8 March and 5 on 13 April.

Crested Tern *Sterna bergii*

Numbers fluctuated but generally declined through March and April. The greatest number recorded was about 100 on 12 March and during that month 15 to 20 were seen on most days. From 23 March the count exceeded 10 on only one occasion, that being 40 on 15 April. One (1981/2/185) collected at Ordnance Point on 15 April, had been banded as a nestling on Stonywell Island, The Coorong, South Australia, on 19 December 1971.

Brush Bronzewing *Phaps elegans*

Single birds were occasionally flushed from clearings near to teatree scrub or sclerophyll gullies.

Yellow-tailed Black Cockatoo *Calyptorhynchus funereus*

Single birds and small parties were seen in the general area on several occasions, the greatest number being 11 on 15 April.

Sulphur-crested Cockatoo *Cacatua galerita*

From one to six were seen in the general area on seven days between 2 and 28 March, after which it was apparently absent.

Ground Parrot *Pezoporus wallicus*

Found sparsely distributed throughout the areas of heathland and buttongrass. the most seen on any one day was six, the more usual number being one or two, though considerable time and effort was spent in trying to flush it by walking through its habitat. Never more than a single bird was flushed from one site.

Swift Parrot *Lathamus discolor*

Two were seen flying north on 2 March.

Green Rosella *Platycercus caledonicus*

Reglarly seen throughout the area, in pairs and small parties, mostly in association with stunted eucalypt, sclerophyll forest or teatree scrub.

Blue-winged Parrot *Neophema chrysostoma*

Regularly seen in small flocks, usually within a few hundred metres of the high tide line. In the first week of March no more than 10 were found on any day. Greatest numbers were seen between 8 March and 2 April when between 30 and 70 were present on most days. From 16 to 23 April the daily count ranged between six and 15 birds. Small parties were sometimes observed resting on the sand just above the high tide line and feeding on *Cakile maritima*. When disturbed they occasionally flew over water to rest on rock outcrops along the beach or off shore. On 22 April a party of eight was flushed from an area of heath and button grass about 4km inland.

Orange-bellied Parrot *Neophema chrysogaster*

Positively sighted on five days, all sightings being on the coast between Ordnance Point and Greenes Creek.

On 8 and 9 March, two were seen flying overhead and calling with their characteristic buzzing note.

On 24 March one was seen and heard calling.

On 27 March a single bird was seen and heard and two were found resting and feeding amongst shingles on the shore of a sheltered bay. These birds were noticably more tolerant of human presence than were the Blue-winged Parrots and were watched for about 10 minutes from about 10m as they fed on *Chenopodium glaucum ambiguum*. Upon subsequent inspection it was found that leaves and stems had been chewed.

On 14 April two were seen and heard calling in flight.

Pallid Cuckoo *Cuculus pallidus*

A sub-adult was found living along the shore near Brooks Creek in the last week of February, often resting on rock outcrops as if endeavouring to camouflage its presence in the manner of a frogmouth (*Podargus* sp.).

Southern Boobook *Ninox novaeseelandiae*

One was heard calling on the nights of 22 March, 12 and 18 April.

White-throated Needletail *Hirundapus caudacutus*

Present in fluctuating numbers on most days between 1 March and 2 April. From 1 to 3 March daily estimates range from 40 to 200, on 8 March about 100 were present , and on 12 March about 30. The concentrations increased towards the end of the month with daily estimates for 26 to 31 March being 300, 300, 600, 400, 1 000 and 50 respectively. On 26 March all were flying southwards but on the following day, all were flying northwards. Only three and six were seen on 1 and 2 April respectively, after which none were observed.

Skylarks *Alauda arvensis*

Not noticed until the third visit, from 13 to 23 April, when up to six were regularly seen along the coast, living on the grassy clearings. They were noticably more timid than the pipits and would usually fly high and leave the immediate vicinity when approached.

Welcome Swallow *Hirundo neoxena*

Up to 15 were seen in the general area on most days in March, hawking over the coast and inland over the heath. Individuals were sometimes found resting on the beach, on or near decaying kelp, where they appeared to be catching small insects. From one to three were seen on only three days during the third visit, the last being a single bird on 23 April.

Tree Martin *Cecropis nigricans*

Up to 10 were seen on most days between 1 and 11 March, hawking over the coastal heath, after which it was absent. None were seen to alight on the decaying kelp, as did the swallows.

Richards Pipit *Anthus novaeseelandiae*

Regularly seen on the first and second visit but in gradually decreasing numbers. Sightings were mostly of pairs and usually on the grazed-grass clearings along the coast. If disturbed they remained in the vicinity. From 10 to 30 were found in the general area between 4 and 11 March but from 22 March to 2 April never more than six were recorded.

On the third visit only two were recorded, on 14 and 16 April.

Black-faced Cuckoo-shrike *Coracina novaehollandiae*

Seen on eight days between 8 and 30 March, mostly in the last week of that month and usually in small parties gradually moving northwards.

White's Thrush *Zoothera dauma*

Present in most of the densely vegetated, damp gullies, in thick scrub along creek banks and around lagoons from where it was often heard calling.

Blackbird *Turdus merula*

Apparently rare and shy, a single bird being seen on only four occasions in April.

Pink Robin *Petroica rodinogaster*

Single males in adult plumage were recorded on 26 and 29 March. These were in dry, scrubby areas near Ordnance Point and were apparently transitory individuals. Grey *Petroica* spp. were often seen in the general area and though some of these were probably Pink Robins, none were positively determined as such.

Flame Robin *Petroica phoenicea*

A few were seen irregularly, mostly in mid April when up to six were recorded on several days.

Scarlet Robin *Petroica multicolor*

Rarely found, the only records being of two birds on each of three days, 25 March, 2 April and 15 April.

Dusky Robin *Melanodryas vittata*

Regularly found throughout the general area, usually in pairs or small parties. It appeared most common towards the end of March when up to 20 were recorded on one day.

Olive Whistler *Pachycephala olivacea*

Regularly seen and heard calling in the dense scrub and wet gullies.

Golden Whistler *Pachycephala pectoralis*

Rarely found in the area but individuals were occasionally seen further inland on the edge of sclerophyll forest.

Grey Shrike-thrush *Colluricincla harmonica*

Regularly seen and heard throughout the area, favouring the patches of stunted eucalypt and the teatree scrub.

Grey Fantail *Rhipidura fuliginosa*

Found fairly regularly but mostly so in the latter half of March when pairs and individuals were often heard calling and seen feeding in areas of eucalypt and teatree scrub.

Superb Fairy-wren *Malurus cyaneus*

Common and regularly seen throughout the area, with up to 50 being recorded on some days. It was found to favour the patches of teatree and dense scrub adjacent to dry lagoons and grassland, from which it ventured to feed in the open but would return to cover when disturbed. Males were found in both eclipse and full breeding plumage.

Southern Emu-wren *Stipiturus malachurus*

Common and widely distributed but living only in places where the button-grass and heath was sufficiently dense to provide good cover. Because of its secretive nature, it was difficult to find but its faint whisper-like call was often heard without the bird being seen. Damp drainage areas appeared to be strongly favoured.

White-browed Scrubwren *Sericornis frontalis*

Found to occur commonly in dense teatree and scrub from where its scolding alarm call was often heard.

Calamanthus *Sericornis fuliginosus*

Common and widely distributed throughout the heathland and also found amongst the coastal scub growing near to the shore.

Brown Thornbill *Acanthiza pusilla*

Regularly found in pairs and small parties throughout the area, favouring the stunted eucalypts, teatree and scub where it occurred together with the Tasmanian Thornbill.

Tasmanian Thornbill *Acanthiza ewingii*

Common and regularly found in patches of stunted eucalypt and scrub, usually in association with the Brown Thornbill with which it formed small parties.

Yellow-throated Honeyeater *Lichenostomus flavicollis*

A few were seen on most days, usually in or near to patches of stunted eucalypts.

Strong-billed Honeyeater *Melithreptus validirostris*

Small parties were found occasionally in the sclerophyll forest gullies several kilometres inland but it was not found to visit the stunted eucalypts or teatree near the coast.

Crescent Honeyeater *Phylidonyris pyrrhoptera*

One of the most common and conspicuous birds in the area, occurring in eucalypts, teatree and heath. It was found to be most numerous in early March when up to 50 were recorded on some days but appeared to be somewhat less so in the latter part of that month.

New Holland Honeyeater *Phylidonyris novaehollandiae*

Only rarely encountered and then only as single individuals, apparently passing through the areas of teatree in a nomadic manner.

Tawny-crowned Honeyeater *Phylidonyris melanops*

Commonly found in the more exposed areas of heathland and stunted eucalypt, in singles, pairs or in small, noisy parties which sometimes gathered in eucalypt patches.

Eastern Spinebill *Acanthorhynchus tenuirostris*

Regularly seen throughout the area but never were more than 10 recorded in a day. It was found to favour the tall heath, shrubs, teatree and stunted eucalypts.

White-fronted Chat *Ephthianura albifrons*

Common along the shoreline, amongst the coastal sand dunes and on grassy clearings. It formed parties of up to 10 which included adults and sub-adults and when disturbed often flew to a rocky prominance before returning to feed amongst the litter or grass.

Silvereye *Zosterops lateralis*

Very common from 2 to 12 March when sightings of between 50 and 300 were recorded on most days. It was noticably less numerous on the second visit when, in the last week of March, the daily count usually ranged between 10 and 20. In the latter half of April, its number had fallen still further with never more than two being seen on any day from 17 to 23 April.

It favoured the eucalypts, teatree, taller heath and shrubs, and in March occurred in flocks which worked the foliage for insects as they passed through on their northwards migration.

European Goldfinch *Carduelis carduelis*

A few were seen occasionally, usually in parties of less than 10. It was found to favour the sand dune vegetation along the shoreline and on 17 April two in sub-adult plumage were observed feeding amongst *Cakile maritima* growing along the beach on Ordnance Point.

European Greenfinch *Carduelis chloris*

One or two were seen occasionally, close to the coast, between Greenes Creek and Ordnance Point.

Beautiful Firetail *Emblema bella*

Regularly seen throughout the area, usually in pairs in the vicinity of teatree.

Common Starling *Sturnus vulgaris*

Common along the coast where it was observed feeding amongst the decaying kelp. It formed flocks of up to 50 which were often seen flying over water and alighting on off-shore rocks. It was most plentiful in March when up to 85 were seen on one day. The most seen on one day in April was 30.

Grey Butcherbird *Cracticus torquatus*

One was heard calling at Ordnance Point on each day from 7 to 10 March after which it was not again heard.

Black Currawong *Strepera fuliginosa*

One or two, apparently transitory birds, were seen on several occasions in March.

Grey Currawong *Strepera versicolor*

Four were seen on 12 March and two on 27 March.

Forest Raven *Corvus tasmanicus*

Common and regularly seen throughout the area, often in small parties feeding amongst decaying kelp or animal carcases along the shore. A sub-adult learnt to invade the camp for discarded food scraps. The most seen on any one day was about 50.

Reptiles

Snakes and lizards were collected by turning stones, wood, sheets of tin and in rubbish heaps, etc., and from pit-fall traps and by hand when found sunning. A total of 101 specimens representing 10 species were collected.

Systematic List

Tiger Snake *Notechis ater*

Three were collected in the general area and no others, known to be of this species, were seen. A sub-adult (330mm) was hand caught at Brooks Creek on 16 April and an adult female (total length 1 040mm), found dead on the vehicular track near Greenes Creek on 1 March, had bird remains in its gut. One was carrying a heavy infestation of nematodes in the gut.

Copperhead Snake *Austrelaps superba*

This snake is apparently uncommon in the area. The only one collected was an adult female (total length 780mm) which was hand caught at Brooks Creek in heathland on 25 March. It was heavily infested with nematodes in the gut and within the lung.

White-lipped Snake *Drysdalia coronoides*

Apparently uncommon in the area. Only three were collected and few others sighted. An adult female (total length 385mm) collected in heathland at Brooks Creek on 20 April was found to have a complete Metallic Skink in its gut.

Dragon Lizard *Amphibolurus diemensis*

Common on the dryer, elevated areas of heathland. Eight were collected in March but none were found in April. None were found to be pregnant but testes of males were enlarged, meausuring to 10 x 5mm.

Whites Skink *Egernia whitii*

Common on the dry, rocky ridges where it forms burrows beneath the loose stones. Seven were collected in March and one in April. None were found in breeding condition.

Metallic Skink *Leiolopisma metallica*

Common throughout the area. Twenty-eight were collected and included juveniles of a rostral-anal length of 20mm. None were found to be pregnant and the largest testes measured 6 x 3mm. A few individuals were orange on the ventral surface.

Three-lined Skink *Leiolopisma trilineata*

This was the least common of the *Leiolopisma* spp. in the Brooks Creek area, 13 being collected. Juveniles of a rostral-anal length of 26mm were included. None were found to be pregnant and the largest testes measured 6 x 4mm.

Small-scaled Skink *Leiolopisma pretiosa*

Not found in the heathland around Brooks Creek but three were collected from beneath loose bark hanging from the side of a eucalypt tree in sclerophyll forest near the Thornton River. One was a juvenile with a rostral-anal length of 35mm.

Tussock Skink *Leiolopisma entrecasteauxii*

Common and widely distributed, more being collected than of any other reptile. Notable amongst the 31 specimens were three in which the dorsal colour tended to be golden olive, contrasting with the more typically dark grey form of the other 28. In these three specimens the frontoparietal was atypically undivided or only partly divided. They were collected from grassy areas near the shore.

In the opinion of Allen E. Greer, Curator of Reptiles, Australian Museum, Sydney, these three specimens (registered numbers 1981/3/50, 1981/3/113 and 1981/3/117) represent Form B of this species, discussed by Jenkins & Bartell (1980, page 159) who consider it may eventually be shown to be a separate species.

Juveniles of a rostral-anal length of 25mm were collected but no adults were found to be pregnant and the largest testes measured 4 x 2mm.

Southern Bluetongue *Tiliqua nigrolutea*

Uncommon in the area, only two being seen and collected. One was an adult female accidently caught in a break-back snap trap set for small mammals on 2 April, and the other, an adult female with three full-term embryos, was caught at Brooks Creek on 6 March

Amphibians

Frogs were collected by turning litter, searching in vegetation in dry lagoons, pit-fall trapping and by searching with a spotlight at night. A total of 205 specimens representing seven species was collected.

Systematic List

Banjo Frog *Limnodynastes dumerili*

Not found on the first visit (28 February to 13 March) but with the cooler, wet weather after mid March, it became increasingly active. Several were caught travelling across exposed ground but it was not heard to call.

Brown-striped Frog *Limnodynastes peroni*

Two were collected close to the coast. One was desiccated and had been dead for some time. The other was caught on 18 April in a pit-fall trap set amongst bracken ferns behind the sand dunes at Ordnance Point. These records are the most southerly for this species.

Common Eastern Froglet *Crinia signifera*

Seven were collected from beneath litter in and around dry lagoons in April. None were heard to call.

Tasmanian Froglet *Crinia tasmaniensis*

One was collected several kilometres inland in wet sedgeland, about 5km north of Brooks Creek.

Smooth Froglet *Geocrinia laevis*

Common throughout the area, especially in dry lagoons and drainage areas. It was not heard calling and remained inactive throughout the first visit (28 February to 13 March) but became increasingly active with the onset of autumn rains. Sixteen were collected on the second visit (21 March, 3 April) and 58 on the third visit (11 to 24 April) by which date it was calling constantly and many egg masses were found beneath decaying vegetation on dry lagoon beds.

Brown Tree Frog *Litoria ewingii*

The most common frog in the area, and it was collected in approximately equal numbers throughout March and April. It was found to call more vigorously and often with the onset of the cool and wet conditions in April. Calling individuals were often found, with the aid of a spotlight, up to 2m above the ground in teatree.

Green and Golden Tree Frog *Litoria raniformis*

The cooler, damp weather from March appeared to stimulate the nocturnal activity of this frog and several were then found, with the aid of a spotlight, on the exposed edges of dry lagoons. None were heard calling.

Fresh-water Fish

Fish were collected by hand line, wire funnel-traps, netting and by turning stones in pools and streams. A total of 215 of four species were collected.

Systematic List

Spotted Mountain Trout *Galaxias truttaceous*

Very common in the lower reaches of Brooks Creek where it was easily caught in a funnel-trap, by hook and line, and by netting with a dip net. Largest individuals weighed up to 30gm, and attained a length of 146mm. Smaller specimens were found up to 3km inland, hiding beneath stones in the swifter running streams, and in small muddy pools only a few centimetres deep with very little flow. It appeared to be in constant numbers throughout February, March and April.

Climbing Galaxias *Galaxias parkeri*

Common in the lower reaches of Brooks Creek during the first visit (28 February to 13 March) when it was easily caught in a funnel-trap baited with raw meat. The largest specimen

weighed 10gm and had a total length of 104mm. After mid March, when rain increased the flow of water in the Brooks Creek, it could not be found though a funnel-trap was kept baited and searches made.

Short-finned Eel *Anguilla australis*

Common in Brooks Creek during the first visit (28 February to 13 March) when it was regularly caught in a funnel-trap, on hook and line and by hand. Larger individuals, up to one metre long, were taken only in the deep, sheltered lower reaches but smaller eels of about 15cm were found living amongst pebbles in the swiftly running sections about a kilometre from the sea.

After the middle of March, rain continually increased the flow of water in Brooks Creek and though a funnel-trap and hook and line were often set, baited with raw meat, no further eels were caught, nor could any be found by searching amongst pebbles or by spotlighting at night.

Congolli *Pseudaphritis urvilli*

Common in the lower reaches of Brooks Creek. It was caught in a funnel-trap baited with raw meat and by hand from beneath stones in the faster-flowing sections. Some were also caught in a sheltered tidal pool at Gannet Point about a kilometre north of the Brooks Creek estuary.

Marine Fish

Prevailing wind and rough sea often made intertidal collecting difficult but at the end of March, two relatively calm days made possible some work in a sheltered inlet near Smiths Gulch. The following species were collected, the number in brackets being subsequently registered into the collections. A total of 322 representing 13 species were collected.

Bearded Rock Cod *Physiculus barbatus* (4)
Greenback Flounder *Rhombosolea tapirina* (2)
Yellow-eyed Mullet *Aldrichetta forsteri* (16)
Silver Fish *Taeniomembras tamarensis* (23)
Luderick *Girella tricuspidata* (1)
Dragonet *Bovichtus variegatus* (2)
Goby (2 species, to be determined) (87)
Blenny *Pictiblennis tasmanianus* (24)
Common Weedfish *Clinus perspicillatus* (77)
Globe Fish *Atopomycterus nicthemerus* (3)
Leatherjacket *Acanthoriuteres* sp. (1)

A Butterfly Mackerel *Gasterochisma melampus* was found alive on the beach at Ordnance Point, having been stranded by a receding wave. This was only the third specimen recorded from Tasmanian waters (Scott 1982).

Invertebrate Fauna

Invertebrates were collected as opportunity permitted, from tidal pools between Ordnance Point and Gannet Point by searching amongst weed and beneath stones, from shrubs by shaking the foliage over a drum, from beneath logs, stones and general litter, by netting flying insects, and by searching with a spotlight at night. Most such material was bulk preserved in alcohol for later determination and study. It has since been roughly sorted, some has been identified, and is summarised below.

Systematic List

Mollusca: species list

- Amphineura
  - Chitonida
    - Chitonidae
      - *Sypharochiton pellis-serpentis*
  - Gastropoda
    - Fissurellidae
      - *Montfortula rugosa*
    - Patellidae
      - *Cellana solida*
      - *Patella (Scutellastra) peronii*
    - Trochidae
      - *Austrocochlea constricta*
      - *Austrocochlea concamerata*
      - *Austrocochlea odontis*
    - Turbinidae
      - *Subninella undulata*
    - Neritidae
      - *Melanerita melanotragus*
    - Littorinidae
      - *Littorina (Littoraria) praetermissa*
      - *Bembicium nanum*
    - Hydrococcidae
      - *Hydrococcus brazieri*
    - Muricidae
      - *Dicathais textiliosa*
      - *Lepsiella vinosa*
    - Buccinidae
      - *Cominella lineolata*
    - Fasciolariidae
      - *Pleuroploca australasia*
    - Nassariidae
      - *Parcanassa pauperata*
    - Conidae
      - *Floraconus anemone*
- Pulmonata
  - Basommatophora
    - Siphonariidae
      - *Siphonaria diemenensis*
    - Planorbidae
      - *Physastra gibbosa*
  - Stylommatophora
    - Caryodidae
      - *Caryodea dufresnii*
    - Charopidae
      - *Stenacapha hamiltoni*
    - Limacidae
      - *Lehmannia nyctelia*
      - *Lehmannia (limacus) flava*
    - Helicidae
      - *Helix (Cryptomphalus) aspersa*

Bivalvia
Anisomyaria
Mytilidae
Brachidontes rostratus
Xenostrobus pulex
Tellinidae
Pseudarcopagia victoriae
Sanguinolariidae
Soletellina biradiata

Arthropoda: species list with numbers in brackets being number of specimens collected.

Arachnida
Araneida (Spiders)
Theridiidae
Latrodectus hasselti (1)
Agelenida
Nicodamus bicolor (5)
Lycosidae
Lycosa tasmanica (2)
Clubionidae
Miturga agelina (2)
Sparassidae
Zachria spenceri (7)
Olios patellatus (3)
Plus another 55 of about 10 species.

Scorpionidae (Scorpions)
Bothriuridae
Cercophonius squama (18)

Phalangida (Harvestmen) (2)
Pycnogonida (Sea Spiders) (2)

Insecta
Odonata (Dragonflies) (9)
At least four species.
Balattodea (Cockroaches) (2)
Mantodea
Mantidae
Tenodera australasiae (1)
Plus another species.
Dermaptera (2)
Orthoptera
Stenopelmantidae (Tree Cricket) (1)
Gryllidae (Field Cricket) (1)
Gryllotalpidae (Mole Cricket) (1)
Acrididae (Grasshopper) (4)
Hemiptera
Reduviidae (Sucking Bug) (8)
Pentatomidae (Assasin Bug) (2)
Coleoptera
Carabidae (Carabid Beetle) (6)
Dytiscidae (Carnivorous Water Beetle) (1)
Hydrophilidae (Water Beetle) (1)

Silphidae (Carion Beetle) (1)
Staphylinidae (Rove Beetle) (1)
Geotrupidae (Scarab Beetle) (3)
Scarabaeidae (Chafer Beetle) (4)
Cantharidae (Soldier Beetle) (1)
Coccinellidae (Ladybird Beetle) (1)
Tenebrionidae (Ground Beetle) (4)
Lagriidae (Ground Beetle) (4)
Chrysomelidae (Leaf Beetle) (7)
Curculionidae (Weevil) (5)

Diptera
Tipulidae (Cranefly) (2)
Plus 24 species in numerous families.

Lepidoptera
Phychidae (Casemoth, larva) (1)
Papilionidae
Graphium macleayanum (Swallow-tail Butterfly) (1)
Nymphalidae
Heteronympha penelope (Shouldered Brown Butterfly) (8)
Heteronympha myrope (Common Brown Butterfly) (3)
Vanessa kershawi (Australian Painted Lady Butterfly) (1)
Hepialidae (1)
Anthelidae (Tussock Moth) (1)
Noctuidae (Noctuid Moth) (3)

Hymenoptera
Ichneumonidae (Ichneuman Wasp) (4)
Pompilidae (Digger Wasp) (2)
Tiphiidae (Flower Wasp) (7)
Vespidae
Vespula germanica (European Wasp)
Apidae (Native Bee) (1)
Formicidae (Ant) (5)
Plus four species not classified.

Myriapoda
Diplopoda (Millipede)
Fifty of at least three species

Chilopoda (Centipede) (5)

Peripatus
Ooperipitus insignus
One was collected from inside an abandoned, dry yabbie burrow, about 20cm deep, about 2km inland from Brooks Creek estuary.

Crustacea
Isopoda
Sphaeromatidae
Cymodoce cf. *convexa* (10)
Cymodoce cf. *granulata* (15)
Inoteidae
Euidotea caeruleotincta (1)
Paridotes ungulata (4)

- Ligiidae
  - *Ligia australiensis* (3)

- Tanaidacea
  - Paratanaidae (1)
  - Tanaidae (1)

- Syphonophora
  - *Physalia* sp. (2)

- Actinaria
  - Actiniidae (2)

- Copepoda
  - A series of barnacles.

- Decapoda
  - Palaemonidae
    - *Leander* sp.
    - *Palaemonetes* sp. (7)
  - Lomisidae
    - *Lomis hirta* (10)
  - Spirulidae
    - *Spirula spirula* (1 shell only)
  - Grapsidae
    - *Brachynotus spinosus* (1)
    - *Cyclograpsus granulosus* (15)
    - *Leptograpsus octodentalis* (2)
    - *Paragrapsus quadriedentatus* (10)
  - Majidae
    - *Notomithrax ursus* (2)

- Amphipoda
  - Ampithoidae
    - *Ampithoe* sp. (25)
  - Grammaridae (2)
  - Talitridae
    - *Orchestia* sp. (1)

Annulata
- Earthworms (10)

Echinodermata
- Asteroidea
  - Asterinidae
    - *Asterina scobinata* (1)
    - *Patiriella exigua* (51)
    - *Patiriella calcar* (205)
  - Asteriidae
    - *Coscinasterias calamaria* (12)
    - *Allostichaster polypax* (7)

- Ophiuroidea
  - Ophiomyxidae
    - *Ophiomyxa australis* (1)

Ophiochitonidae
Ophionereis schayeri (1)
Ophioceres bispinosa (2)

Echinoidea
Temnopleuridae
Holopneustes inflatus (3)
Strongylocentrotidae
Heliocidaris erythrogramma (1)

Platyhelminthes
Diplosolenia johnstoni (2)
Geoplana sugdeni (7)

Porifera

A small series of dried sponges was collected from beaches.

ACKNOWLEDGEMENTS

Many people contributed in a variety of ways to the organisation of the expedition, to the collection of material and data and to its eventual success. Dr. James D. Lazell, Jr. of The Conservation Agency initiated the programme, organised personnel and actively participated in the field work. He also undertook a study of the devil population and wrote pages 53 to 56. The "Earthwatch" organisation of Massachusetts, through its member participants, provided both financial support and field staff, without which the programme would have been impracticable. As field guide and local organiser, James Malley played a most significant role, giving freely of his time and personal support both before and during the field work. Judy Gadsby, Zoology Assistant, Queen Victoria Museum, participated in all three visits, collecting, preparing and curating material. Mary Cameron, Honorary Associate in Botany, Queen Victoria Museum, participated in the second visit, collecting and preparing botanical specimens and subsequently writing the section on vegetation. Jim Stockton, Australian National University, visited the study area on several occasions during the course of his archaeological research, gave interesting talks to participants and subsequently contributed the archaeology section. Dr. R. E. Mesibov, Forestry Commission, visited the camp and talked on the collection of some invertebrates. Lyle House and Bevin Reeve of Smithton extended friendship and help on numerous occasions and maintained radio, telephonic and postal links with Smithton and beyond.

The Tasmanian National Parks and Wildlife Service, the Department of Lands and their local officers assisted greatly by helping with the transport of personnel and equipment between Smithton and Brooks Creek and in their sanctioning and general cooperation and support of the whole operation. Daryl Wells and Mark Lardner also helped with transport.

Grateful acknowledgement is also made for the examination and determination of material by the following: Dr. A. E. Greer, The Australian Museum, reptiles; E. O. G. Scott, Honorary Research Associate, Queen Victoria Museum, fish; R. C. Kershaw, Honorary Research Associate, Queen Victoria Museum, molluscs; Robert Burn, Honorary Associate in Invertebrate Zoology, National Museum of Victoria, nudibranchs; S. Fearn, Launceston, insects; Roger Springthorpe, The Australian Museum, crustaceans; Dr. Frank Rowe, The Australian Museum, echinoderms; and Dr. Leigh Winsor, James Cook University, flatworms.

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A POPULATION OF DEVILS *Sarcophilus harrisii* IN NORTH-WESTERN TASMANIA

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The Tasmanian Devil *Sarcophilus harrisii* (Boitard, 1814) is the second largest living marsupial carnivore (Dasyuridae), attaining a total length of *ca* 90cm and a weight of *ca* 12kg. The species is common today; populations have been studied in two widely separated parts of Tasmania, where the species is endemic (Green, 1967, 1973; Guiler, 1970, 1978).

Devils have not always been common and seem prone to dramatic population fluctuations, both long-term and short-term (Guiler, 1970), and at different localities (Guiler, 1978). This study was undertaken in the coastal strip between Brooks Creek and Thornton River on the west coast (Fig. 2) as part of the present "Earthwatch" survey and the region and its vegetation have been previously discussed. The area is remote and difficult of access. There is no permanent agriculture or human settlement. There is one cottage in the study area, seasonally occupied by one to eight people engaged in sport fishing. Transhumance of cattle occurs, and commenced during the study period, March and April 1981. The vegetative communities are maintained by fire, to which the area is prone, especially from December through February (Malley, pers. comm.).

The area differs from the Cape Portland region in north-eastern Tasmania (Fig. 2) where devils have been studied (Green, 1967; Guiler, 1970) in lacking building modifications and permanent agricultural/pastoral use; in having a much greater rainfall (125cm/year vs. 50cm/year); and consequently different vegetative associations. It also differs from the coastal Granville region (Fig. 2) about 50km to the south-east where devils have been studied (Guiler, 1970, 1978) in all those ways, except that rainfall at Granville is greater (175cm/year). Rainfall and vegetational data may be found in Davies (1965).

The extent to which any population yet studied is isolated is not known. The Cape Portland population is probably widely continuous with the rest of *S. harrisii* range in most of eastern Tasmania, because it is similar in degree of development and forestation (Green, 1967). Guiler (1978) felt some demographic characteristics of the Granville population (e.g. cycling) was due to "geographic isolation", but found evidence of immigration into the study area in one year (1973) of his nine-year study. The present author feels that the Brooks Creek — Thornton River population is probably peninsular, in continuity with the bulk of the species' optimal habitats to the north along the coastal fringe. Devils seem scarce or absent from rainforest and wet, interior, upland habitats. Green (1979) saw no devils and found only one set of tracks in a survey just *ca* 30km north-east of the site, in a much wetter region (170cm/year rainfall), in the Arthur drainage across the Norfolk range. At Maggs Mountain, a wet, upland site in the central north also studied by Green (1977), only one half-grown devil was found suggesting the species' ". . . presence in the area may well be due to transient individuals originating from agricultural areas lower down the Mersey Valley".

Southward along the coast of western Tasmania it is suspected that devil populations become localised and discontinuous for variable time periods. This seems concurrent with Guiler's (1978) view of the Granville population and agrees with Malley's (pers. comm.) field observations for the region from Thornton River around the south-west coast of Tasmania.

In the present study trapping was undertaken during three periods: 8 to 11 March (20 trap nights), 22 March to 2 April (96 trap nights), and 12 to 22 April (99 trap nights). The catch averaged one devil per six trap nights. Animals were sexed, categorised young (small), adult (medium), or old (large) on the bases of size and tooth wear, annotated with respect to markings, scars, and peculiar features, marked with gentian violet, and released at point of capture. Traps were the standard sheet metal and wire, single drop door, devil traps used by the

FIG. 2

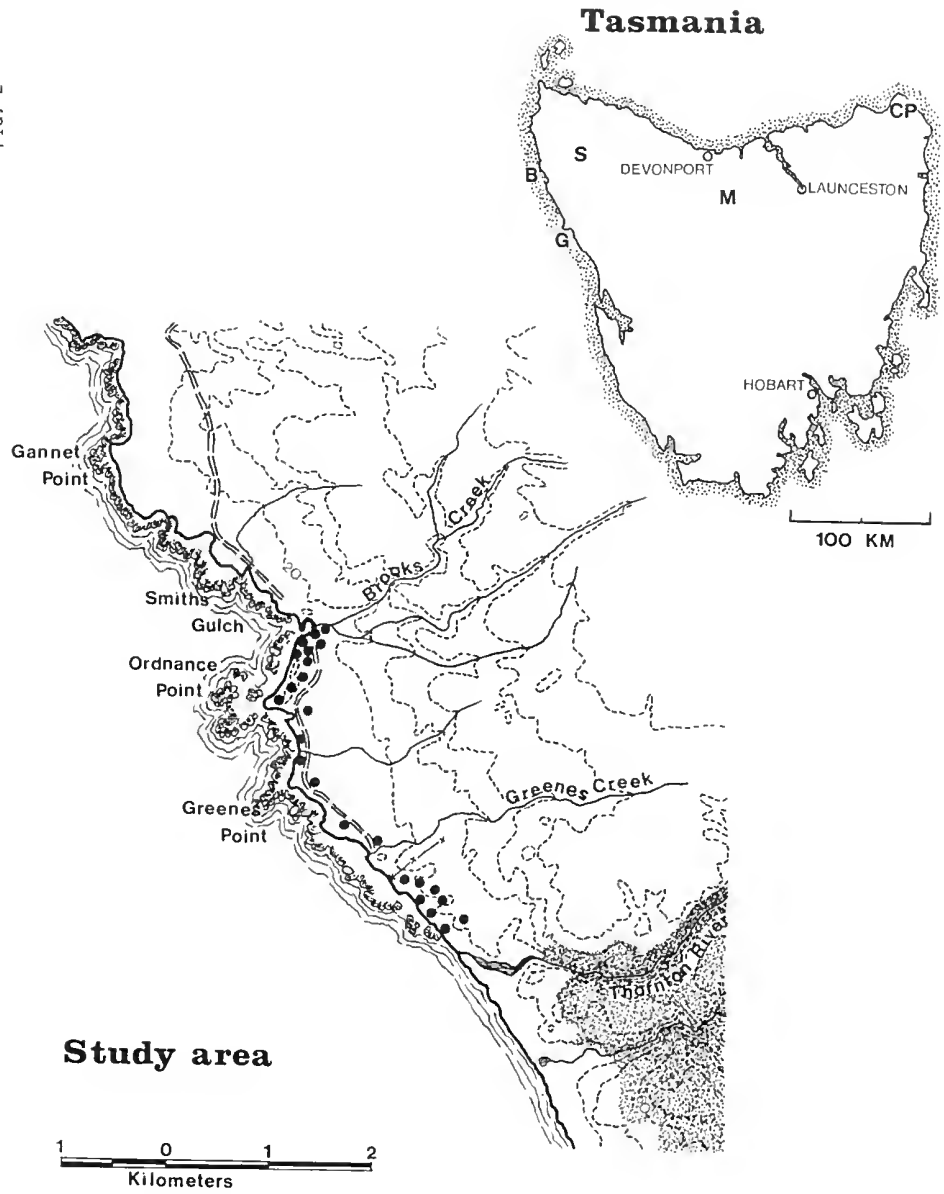

Fig. 2
The study area. Each dot represents a trap station maintained from 5 to 15 nights. Contour lines are at 20m intervals. Stipple indicates wet sclerophyll forest. The access track is represented by broken parallel lines. The inset shows the island of Tasmania with localities mentioned in the text indicated: B, the study area here reported between Brooks Creek and Thornton River; CP, Cape Portland region; G, Granville region; M, area of Green's 1977 survey; S, area of Green's 1979 survey.

Tasmanian National Parks and Wildlife Service. Various baits were used, including rodent carcasses, processed meat (pork sausage), kangaroo (*Marcropus rufogriseus*), and mutton. The last was most successful.

Evidence of devils in the area was always plentiful; tracks and scats were daily observed at many points along the trails through the area and on dunes and beaches. During the study two tiger cats (*Dasyurus maculatus*) were caught and a third observed. Tracks of the quoll (*Dasyurus viverrinus*) were found on four occasions, but none was captured. A popular account of the work, with colour photographs, is available (Wellemeyer, 1981).

Table 1

Some characteristics of the devil population between Brooks Creek and Thornton River, north-western Tasmania, in March-April 1981. Sizes are judged as in Guiler (1978).

Sex	Total	Recaptures	Small	Medium	Large	Average Travel km	Maximum Travel km
♂	14	12	6	4	4	1.8	3.2
♀	6	3	-	3	3	1.4	2.8

Some characteristics of the population are shown in Table 1, with travel distances between recaptures. Although females travelled less than males, the difference was not significant. The travel distances are similar to those obtained by Guiler (1970) in the well-fed, pastoral population at Cape Portland.

It is not believed that emigration, immigration, or mortality significantly affected the population during the study. The old adult males, and one old, non-reproductive female, accounted for two-thirds of the recaptures, and were the most wide-ranging individuals. None was captured in the same trap twice. It is concluded that the recapture rate was not influenced by trap-proneness or trap-shyness. Therefore M_0 of Otis *et al.* (1978) is used to calculate a population of 24±11 devils per km^2 in this area. This is higher than Guiler's greatest density estimate in the pastoral population at Cape Portland: *ca* 12 per km^2. Using the Lincoln Index presented by Overton (1971) a similar figure is obtained: 24, range 13 to 39, per km^2.

At Granville, Guiler (1978) found great periodic fluctuations in populations. In 1968 and 1970 there were lows at Granville of about six or seven devils per km^2. In 1974 to 1975 devils increased to *ca* 40 per km^2. Guiler's average was *ca* 21 per km^2/year which is not significantly different from this calculation.

The Brooks Creek - Thornton River population is seemingly quite different in structure from any previously studied. Green (1967) found more males than females at Icena in the southern portion of the Cape Portland region, but his numbers do not differ significantly from 1:1. Guiler (1970) in the northern portion of the same region, found females significantly more numerous and a ratio of 1:1.16 males to females. The preponderance of males at Brooks Creek - Thornton River and the fairly even size distribution most closely resembles the mercurial Granville population in 1970 (Guiler, 1978, p. 175), but young females were not captured. It was, however, a year of very low density at Granville, about one-quarter of what we found. Guiler's 1971 profile resembled the present in having high old male and low young female representation, but was far more balanced in sexes. In the Brooks Creek - Thornton River sample only two females had pouch young, although this is the peak season for carrying them (Green, 1973). One medium-sized adult carried a full-time complement of four; one large, old female had a single young. None of the other four females showed any indication of reproductive activity.

Perhaps the most interesting question about this population is what sustains it. Green (1967) found the bulk of the diet to be carrion resulting from game (kangaroos, *Macropus* spp.) and stock (mutton) butchering. Guiler (1970) found about one-third of the diet was mutton scraps, offal, and carcasses; these plus kangaroo and wombat (*Vombatus ursinus*), scavenged as carrion or processing waste, accounted for 80 percent of the diet. Even at Granville, Guiler (1978) found the predictable cattle mortality (*ca* 1/km^2/year) would supply the bulk of the devil population's food needs in most years. Both Guiler and Green emphasise the contribution of carrion to the success of studied devil populations. In the present study area such a contribution must be rather small. Domestic stock are there only during the winter months, and mortality is low — never approaching that at Granville (Jack Hanson, pers. comm.). While there is some hunting and fishing, it is strictly seasonal and produces trivial amounts of carrion. The abundance of devil tracks on bare dunes and on the beach indicates that beach-washed carrion may be a major dietary component.

Of the four large dasyurid carnivores in Tasmania, only the devil is presently common enough to provide good comparative population data in a short-term study. Continued, expanded population studies of the devil will predictably give insight and elucidation to the obviously complex phenomena of large marsupial carnivore population biology — a subject of immediate and extreme importance in conservation and wildlife management.

ACKNOWLEDGEMENTS

I gratefully acknowledge the sponsorship of "Earthwatch" and The Center for Field Research, Belmont, Massachusetts, U.S.A. for providing the teams of helpful field assistants. Lands Department Warden Jack Hanson provided information, advice, and logistical assistance for this area under his control. National Parks and Wildlife Service provided traps, permits and the assistance of Officer Gary Melville. The Conservation Agency provided my travel costs.

I especially acknowledge the constant field assistance of James Malley, bushman of the wilderness north-west; he made the impossible easy and most enjoyable.

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ARCHAEOLOGICAL SURVEY OF GREENES CREEK, ORDNANCE POINT AND BROOKS CREEK, NORTH-WEST TASMANIA

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BACKGROUND

A survey of Greenes Creek, Ordnance Point and Brooks Creek in north-west Tasmania was carried out between March 1980 and March 1981 as part of a broader investigation of north-west Tasmania focusing on settlement patterns, site management and sampling methods. Descriptions of the methods of field procedure, site data recording and storage systems are detailed elsewhere (Stockton 1982). Two 500m x 500m sample squares were surveyed intensively and all prehistoric cultural remains found were recorded. The sample areas are referred to as the Greenes Creek and Ordnance Point sample areas and location is shown in Fig. 3. The locations of sites within each sampling area are shown in Figs. 4 and 5 pages 63 and 64.

Both sample areas are similar in geology and coast type. The bedrock is a partially metamorphosed sedimentary sequence, overlain in places by aeolian landforms, particularly along the coastal margin. Study along the north-west of Tasmania has shown that there is a higher concentration and larger volume of shell midden per length of coast within this geomorphological configeration than on either the Quaternary sand or granite coasts which also occur in the vicinity.

RESULTS

A total of 33 sites was recorded, including one rock engraving site and five composed solely of stone artefacts. Information on the location, volume, faunal and artefact contents of the midden sites is summarised in Table. 2.

Of the 27 middens, only three are well preserved while four are in fair condition, and 20 are badly disturbed. Fourteen of the 27 middens have been damaged by wind deflation of the sand dunes on which they rest, and eight have been disturbed by erosion initiated by vehicles.

Plate 9 (page 60) shows a typical eroding midden.

Midden Site Types

Very little can be said about the nature of the sites in the sample because so many have been disturbed. Using a descriptive system proposed by Ranson (1978), the *in situ* sites consist of four small middens, four medium-sized middens, and two linear middens. Remains of one or possibly two Aboriginal hut depressions occur on the surface of one of the linear middens (site 632).

Originally it appeared that the depressions developed as rubbish was dumped around the wall of an existing hut. However, in several sites elsewhere on the west coast, circular depressions were recorded with very little shell in them, or shell in only part of the arc of the rim of the depression. It seems more likely that the depressions were intentionally excavated by the Aborigines in the construction of the hut, and the presence of shell is a secondary process occurring as rubbish is discarded during use. One reference by Robinson, an early explorer of this area, supports this idea that the hut floors were deliberately excavated. "Saw several native habitations on the declivity of a hill dug out of the sand . . ." (Plomley 1966, p. 790). It is

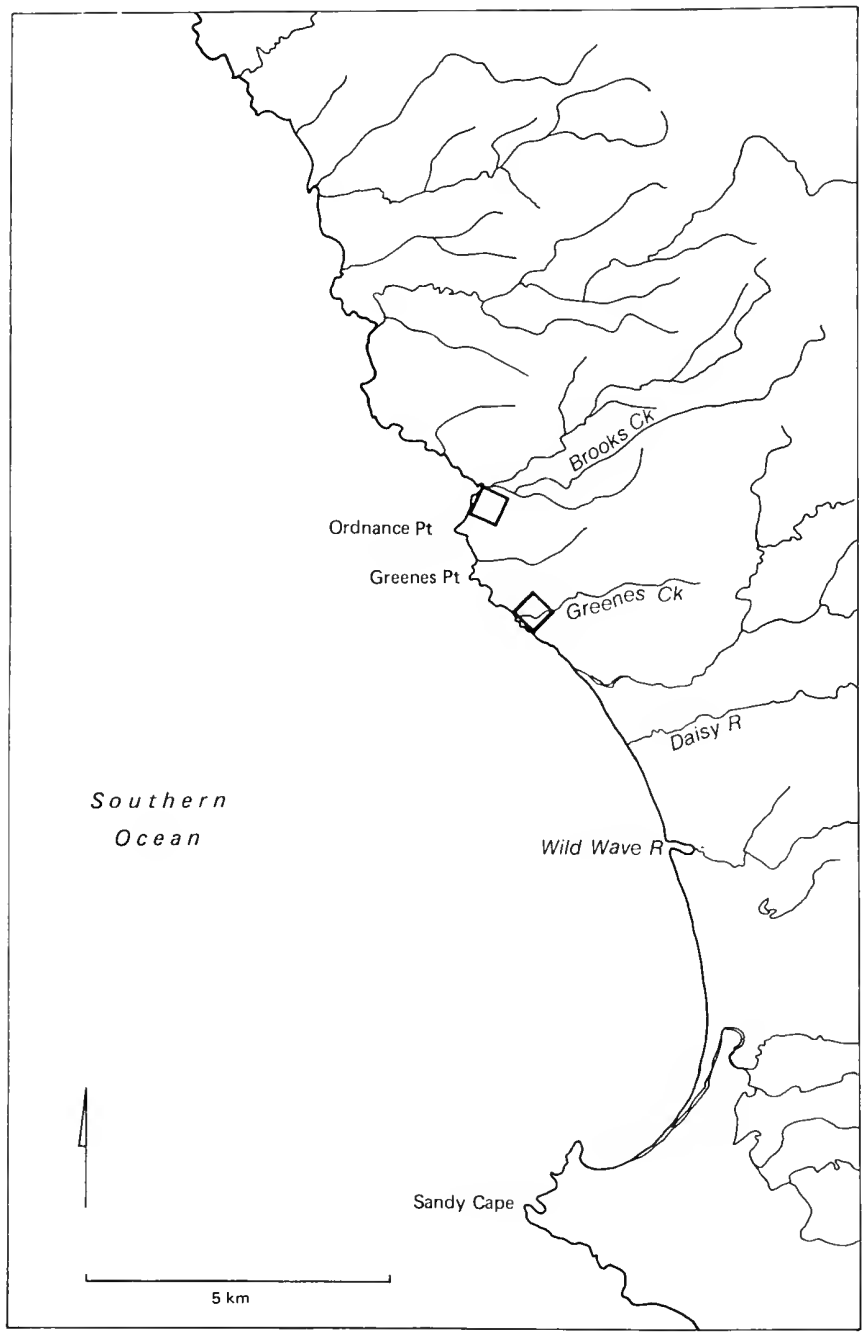

Fig. 3
Study area and location of sample areas

Site	Grid Reference to Sandy Cape 1:100,000 sheet	Volume m^3	CONTENTS																
			Shellfish									Bone			Stone artefacts				
			Subninella undulata	*Notohaliotis ruber*	*Dicathais spp.*	*Brachidontes rostratus*	*Patellanax peronii*	*Pleuroploca australasia*	*Scutus antipodes*	*Cellana solida*	other	Land mammal	Sea mammal	Bird	Black chert	Spongolite	Quartz	Quartzite	other
221	112219	2	x		x	x	x		x										
222	113219	8	x		x										x	x	x		
223	113219	1	x		x		x								x	x	x		
224	112219	—	x	x	x	x													
226	113218	300	x	x	x	x			x	x		x			x	x			
228	113217	5	x		x	x				x					x	x	x		
229	114217	—	x		x	x										x			
230	115216	10	x		x	x	x								x	x		x	
231	114217	400	x	x	x	x			x	x					x	x		x	
232	115216	1	x		x		x										x	x	
234	115218	—	x		x					x	x				x	x		x	
618	108238	—	x	x	x	x	x								x		x		x
619	107238	50	x	x	x	x		x			x		x	x	x	x	x		
620	108234	—	x	x												x		x	
621	107234	4	x	x	x	x										x	x	x	
622	107233	—	x	x							x					x	x		
623	107233	—	x	x	x	x													
624	108235	—	x													x	x		
625	108236	—	x												x				
626	107236	—	x	x	x										x	x	x		
627	107236	—	x	x	x						x								
628	105234	100	x	x	x	x	x	x				x	x	x	x	x	x		
629	106235	100	x	x	x	x	x		x			x	x	x	x		x		
630	106236	20	x	x	x	x	x						x			x		x	
631	106236	5	x	x	x	x	x									x	x	x	
632	110235	7	x	x							x					x		x	
633	110236	3	x	x															

Table 2
Location, volume, faunal and artefact contents of the midden sites.

Plate 9
An Aboriginal midden at Ordnance Point (see Fig 1) showing typical erosion. Broken warrener shells *Subninella undulata* are clearly evident in the foreground.

quite likely that some of the large deflated sites on the foredunes systems also had hut depressions.

Midden Site Contents

Because the contents of deflated sites are fully exposed, considerable information can be gathered by surface observation. For example, eight commonly occurring shellfish were noted in deflated middens, of which *Subninella undulata*, *Dicathais* spp., *Brachidontes rostratus* and *Notohaliotis ruber* contributed the bulk of the meat. The most commonly observed bones were of sea mammals, with the Australian Fur Seal, *Arctocephalus pusillus doriferus*, being the most numerous. Some bones of the Southern Elephant Seal, *Mirounga leonina*, were also found. Small to medium-sized macropods were also an important meat source. Artefacts of black chert, spongolite, quartz and quartzite accounted for 98% of the artefacts recorded. Spongolite was the most commonly observed, followed by black chert. The locations of the sources of these rock types are not known, but their frequent occurrence in sites in the region suggests the sources will be found nearby. A published description for a spongolite quarry was found to be incorrect when checked (Sutherland 1972, p. 36; W. D Jackson pers. comm.).

Site Location

In common with midden site distributions on the west coast, the greatest midden volumes and the largest sites are close to the rocky platforms where the shellfish live. Fig. 6 page 66 is a histogram demonstrating this and also shows the presence of some middens about 500m from the nearest shellfish source. Several sampling areas in other parts of the west coast have shown a similar pattern. Although middens can be found along sandy beaches for several

kilometres away from shellfishing areas (for example at the Daisy River and Wild Wave River), they are not common more than 600m inland.

One other midden was recorded slightly outside the sampling area because of its unusual location. Site 634 is a cluster of at least nine mounds several hundred metres inland on the south side of Brooks Creek. Some of the mounds are cresent-shaped, and appear to be part of the rims of hut depressions. The total volume of the midden is unusually large ($20m^3$) for such an inland location, although as in other middens within the sampling areas, it rests on a sand sheet and contains the usual range of shellfish and stone artefact types. The site is 520m from the nearest shellfish source. From observations made in the 1980-1981 summer, it is possible this location was used in a period of extremely dry weather when the Aborigines camped beside the permanent water of the creek. Normally the sandflies and blood-sucking flies which live in the wet heath surrounding this site make camping impractical, but during periods of dry weather these would be at their lowest numbers.

Rock Engraving

Prior to this survey one area of rock engravings had been described in the study area (Stockton 1977). It is known as the Greenes Creek engraving site. The range of motifs is limited, even for a Tasmanian engraving site, and with the exception of the circle with a cross in the centre consists entirely of simple circles. An example of one of the panels is shown in Fig. 7. page 67.

Antiquity

All the shell middens rest on aeolian sand dune or sand sheet landforms. These features appear to have formed after the sea reached its present level around 6 000 years ago (Davies 1959, 1961). Because of the instability of these landforms and their exposure to strong onshore winds, it is unlikely that any of the middens are more than several thousand years old. For example, the oldest date so far obtained for an open shell midden on the west coast is 4 050 ± 240 BP (ANU-2493) for a site north of the mouth of the Arthur River.

No fish bones were found in any of the sites, so by comparison with similar sites in Tasmania it is likely that all these middens are less than 3 500 years old (Jones 1978).

A sample of charcoal from the base of site 226 at Greenes Point was radiocarbon dated and gave an age of less than several hundred years old (ANU-2494). This date shows that the Aborigines were living on this part of the coast around the time of the arrival of Europeans.

Miscellaneous Finds

Three unusual species of shellfish were found in the Ordnance Point sample area. At site 632 a fragment of *Mactra rufescens* was found and a single *Tucetona flabellatus* shell was found at site 230. May (1958, p. 6) gives the locality of the latter species as the coast east of the Tamar River, so it may have been transported from the north-east, unless the species is more widely distributed than May suggests.

On the surface of site 627 was a complete valve of *Tucetilla striatularis*. This shell has a hole through its apex, and the surface is polished. Use of an oyster shell as a spear scraper was recorded by Baudin in 1802 (Baudin 1974, p. 350), but there is no edge damage to suggest this shell was used in this way. The use of small gastropods as pendants was also recorded (Plomley 1966, pp. 178, 619; 1965, plate 3, and Tasmanian Museum collections) and occasionally punctured oyster shells, presumably carried or traded from Bass Strait, have been found in deflated middens on the west coast. If such shells were used as pendants one would expect use polish around the hole from rubbing with the string or thong which secured it.

This is not apparent in the specimen from site 627. As holes in the apexes of beachwashed specimens of *T. striatularis* are common, one must assume that the perforation is of natural origin, despite the unexplained presence of the shell in site 627.

ACKNOWLEDGEMENTS

I am indebted to R. H. Green for his invitation to participate in the "Earthwatch" survey in March 1981. The field work for this report was carried out while I was a student in the Department of Prehistory, Research School of Pacific Studies, Australian National University. All costs for this study were met by that Department. Mrs. E. Turner identified the unusual shell species from sites 230, 632 and 627. Scott Cane and Mary-Jane Mountain provided comments on an early draft of the manuscript.

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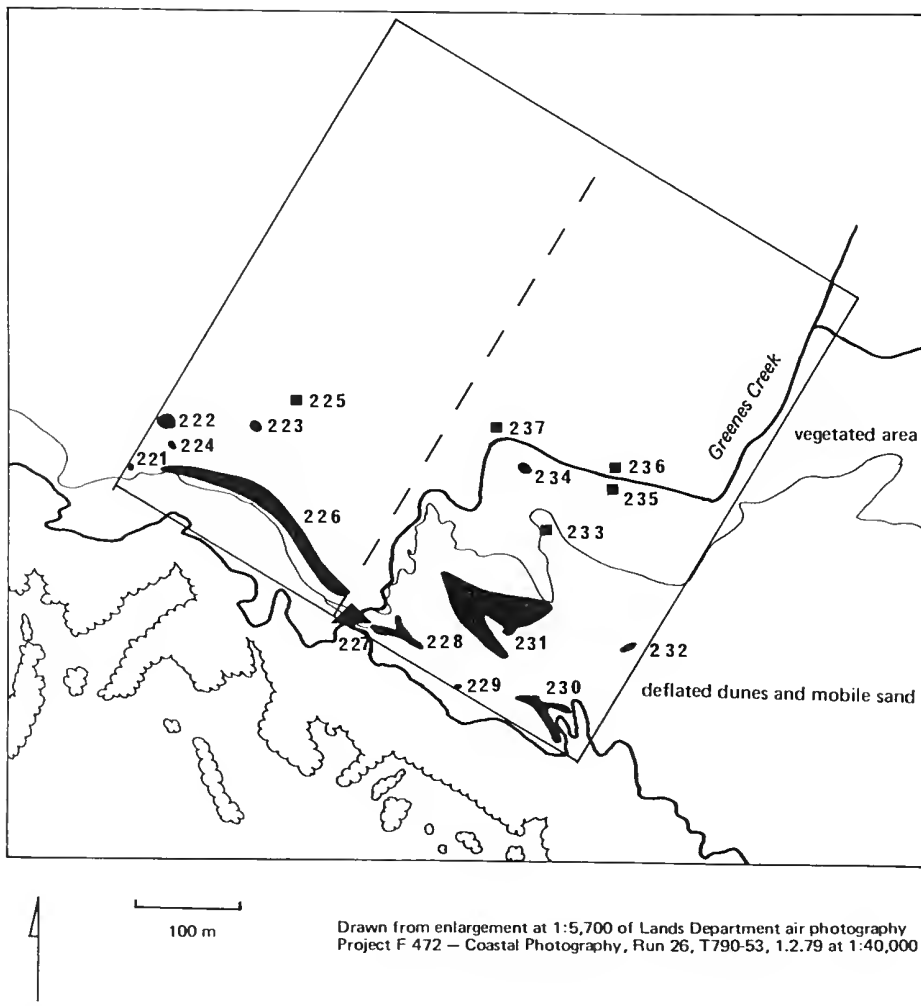

Fig 4
Greenes Creek sample area.

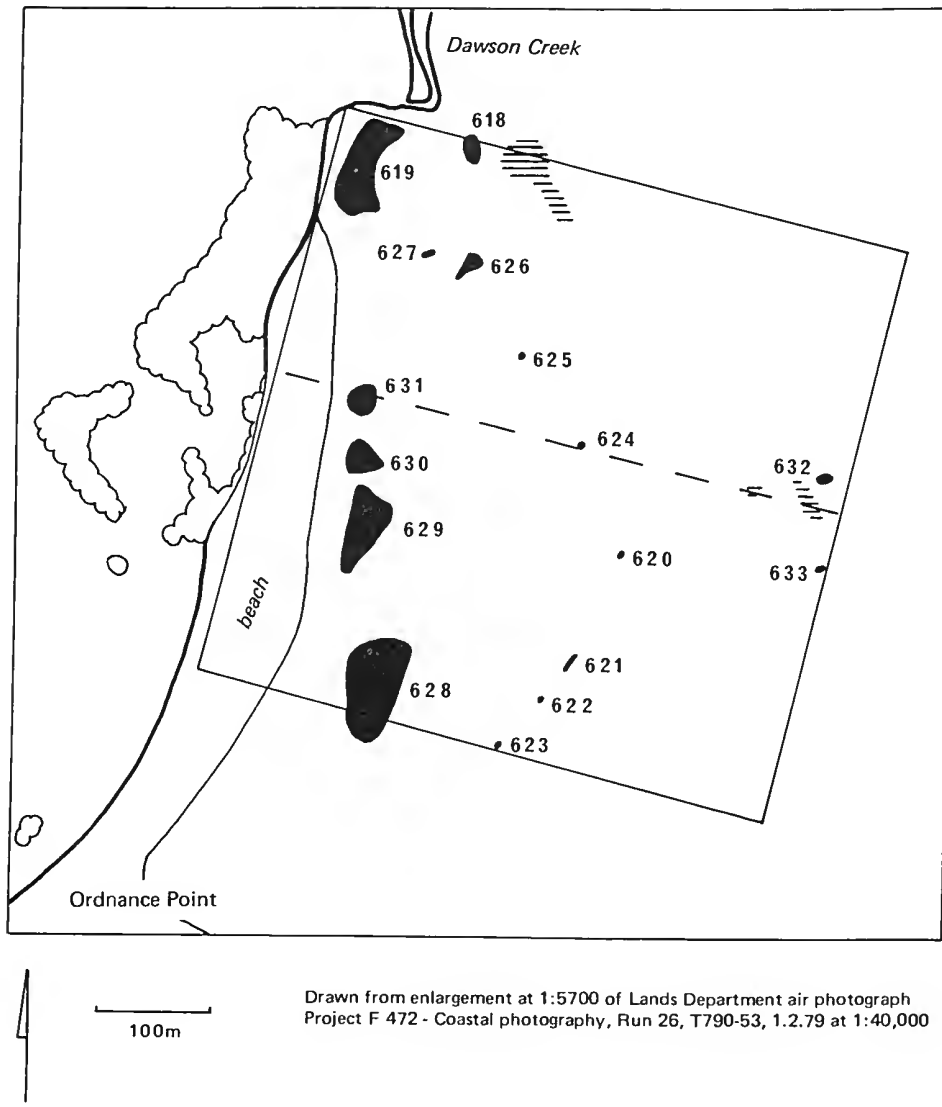

Fig. 5
Ordnance Point sample area.

LEGEND FOR FIGS. 4 and 5

Topographic features

shore

off-shore rocks

river or creek

swamp

sample area boundary

Cultural features

175 midden and number

one or more stone artefacts

engraving

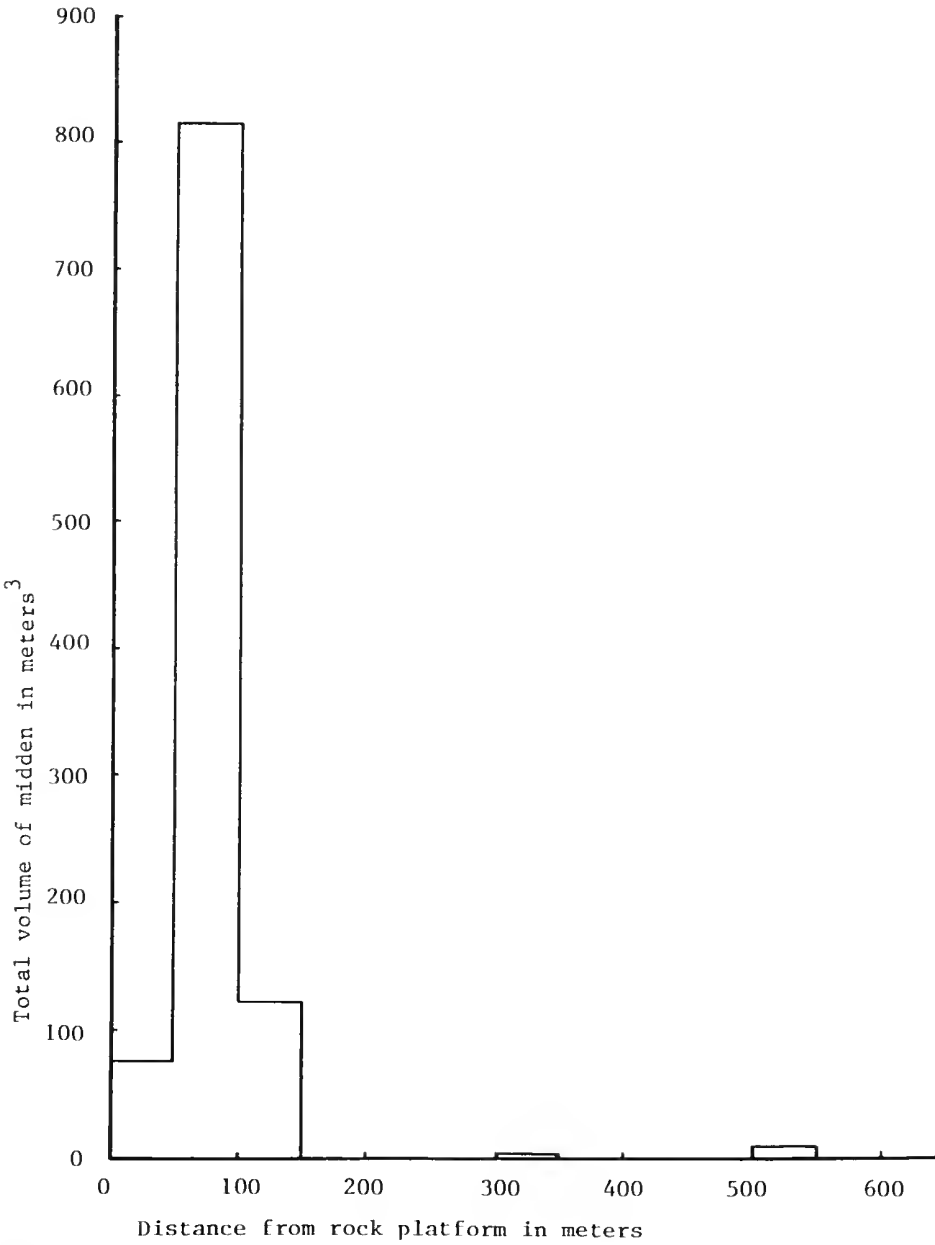

Fig. 6
Histogram of midden volume against distance from nearest rock platform for the sample of 27 middens.

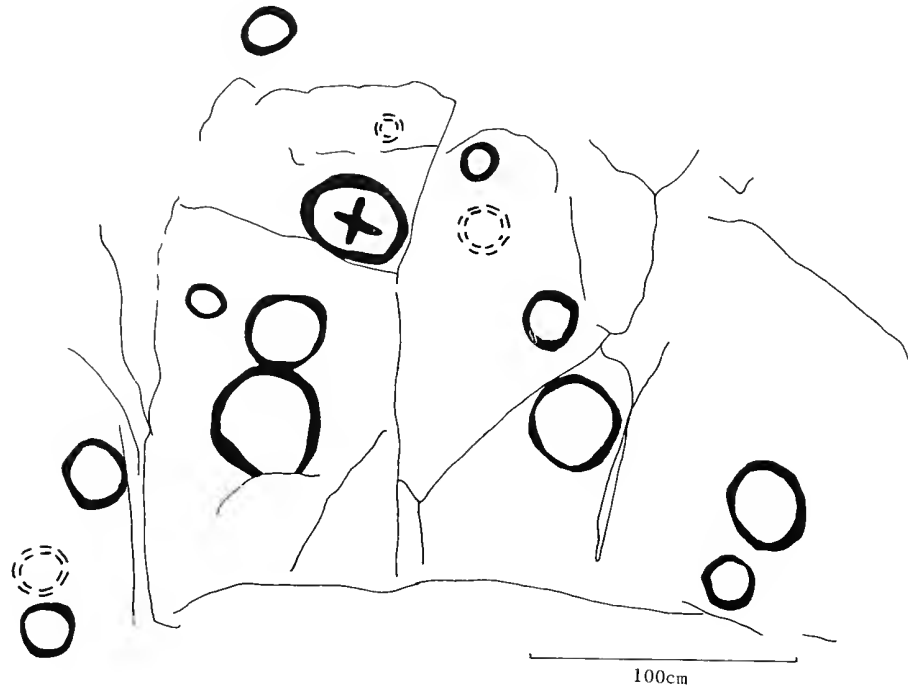

Fig. 7
Typical section of the Greenes Creek Aboriginal engravings.